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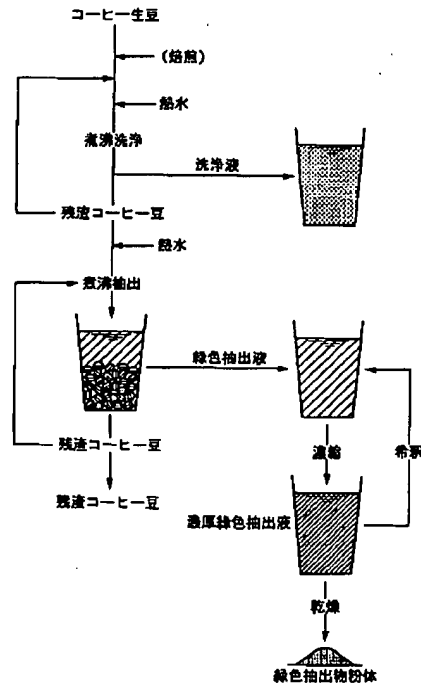
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(54) 【発明の名称】 緑色コーヒー抽出物およびその製造方法

(57) 【要約】

【課題】 鮮やかな緑色系の色調を呈する天然物色素として利用価値を有する緑色コーヒー抽出物を提供すること、及び、廃棄物処理の問題の軽減を可能とした該緑色コーヒー抽出物の製造方法を提供することを目的とする。

【解決手段】 コーヒー豆を水中にて煮沸洗浄し、コーヒー豆残渣を洗浄液から分離する洗浄工程と、洗浄工程後のコーヒー豆残渣を水中で煮沸抽出し、抽出液をコーヒー豆残渣から分離する抽出工程を有することを特徴とする緑色コーヒー抽出物の製造方法および該製造方法により製造される緑色コーヒー抽出物。



## 【特許請求の範囲】

【請求項1】コーヒー豆を熱水中にて煮沸洗浄し、コーヒー豆残渣を洗浄液から分離する洗浄工程と、洗浄工程後のコーヒー豆残渣を熱水中で煮沸抽出し、抽出液をコーヒー豆残渣から分離する抽出工程を有することを特徴とする緑色コーヒー抽出物の製造方法。

【請求項2】コーヒー豆を熱水中にて煮沸洗浄し、コーヒー豆残渣を洗浄液から分離する洗浄工程と、洗浄工程後のコーヒー豆残渣を熱水中で煮沸抽出し、抽出液をコーヒー豆残渣から分離する抽出工程と、前記抽出液を濃縮する濃縮工程を有することを特徴とする緑色コーヒー抽出物の製造方法。

【請求項3】コーヒー豆を熱水中にて煮沸洗浄し、コーヒー豆残渣を洗浄液から分離する洗浄工程と、洗浄工程後のコーヒー豆残渣を熱水中で煮沸抽出し、抽出液をコーヒー豆残渣から分離する抽出工程と、前記抽出液を濃縮する濃縮工程と、濃縮液を乾燥して粉末にする乾燥工程を有することを特徴とする緑色コーヒー抽出物の製造方法。

【請求項4】前記洗浄工程に先立ち、前記コーヒー豆を粉砕処理する粉砕工程を有することを特徴とする請求項1～3に記載の緑色コーヒー抽出物の製造方法。

【請求項5】前記洗浄工程における煮沸洗浄をコーヒー豆1重量部に対して5～100重量部の熱水で、1～5分行なうことを特徴とする請求項1～4に記載の緑色コーヒー抽出物の製造方法。

【請求項6】前記抽出工程における煮沸抽出をコーヒー豆1重量部に対して10～20重量部の熱水で、5～10分行なうことを特徴とする請求項1～5に記載の緑色コーヒー抽出物の製造方法。

【請求項7】前記洗浄工程を複数回行なうことを特徴とする請求項1～6に記載の緑色コーヒー抽出物の製造方法。

【請求項8】前記抽出工程を複数回行なうことを特徴とする請求項1～7に記載の緑色コーヒー抽出物の製造方法。

【請求項9】前記コーヒー豆が、生豆又は生豆を極浅炒りした炒り豆である請求項1～8に記載の緑色コーヒー抽出物の製造方法。

【請求項10】前記したすべての工程に先立ち、前記生豆が予め洗浄処理されていることを特徴とする請求項9に記載の緑色コーヒー抽出物の製造方法。

【請求項11】コーヒー豆を熱水中にて煮沸洗浄し、コーヒー豆残渣を洗浄液から分離する洗浄工程と、洗浄工程後のコーヒー豆残渣を熱水中で煮沸抽出し、抽出液をコーヒー豆残渣から分離する抽出工程により製造されたことを特徴とする緑色コーヒー抽出物。

【請求項12】コーヒー豆を熱水中にて煮沸洗浄し、コーヒー豆残渣を洗浄液から分離する洗浄工程と、洗浄工程後のコーヒー豆残渣を熱水中で煮沸抽出し、抽出液を

コーヒー豆残渣から分離する抽出工程と、前記抽出液を濃縮する濃縮工程により製造されたことを特徴とする緑色コーヒー抽出物。

【請求項13】コーヒー豆を熱水中にて煮沸洗浄し、コーヒー豆残渣を洗浄液から分離する洗浄工程と、洗浄工程後のコーヒー豆残渣を熱水中で煮沸抽出し、抽出液をコーヒー豆残渣から分離する抽出工程と、前記抽出液を濃縮する濃縮工程と、濃縮液を乾燥して粉末にする乾燥工程により製造されたことを特徴とする緑色コーヒー抽出物。

【請求項14】前記洗浄工程に先立ち、前記コーヒー豆を粉砕処理する粉砕工程を有することにより製造されたことを特徴とする請求項11～13に記載の緑色コーヒー抽出物。

【請求項15】前記洗浄工程における煮沸洗浄をコーヒー豆1重量部に対して5～100重量部の熱水で、1～5分行なうことにより製造されたことを特徴とする請求項11～14に記載の緑色コーヒー抽出物。

【請求項16】前記抽出工程における煮沸抽出をコーヒー豆1重量部に対して10～20重量部の熱水で、5～10分行なうことにより製造されたことを特徴とする請求項11～15に記載の緑色コーヒー抽出物。

【請求項17】前記洗浄工程を複数回行なうことにより製造されたことを特徴とする請求項11～16に記載の緑色コーヒー抽出物。

【請求項18】前記抽出工程を複数回行なうことにより製造されたことを特徴とする請求項11～17に記載の緑色コーヒー抽出物。

【請求項19】前記コーヒー豆が、生豆又は生豆を極浅炒りした炒り豆であることを特徴とする請求項11～18に記載の緑色コーヒー抽出物。

【請求項20】前記したすべての工程に先立ち、前記生豆が予め洗浄処理されることにより製造されたことを特徴とする請求項19に記載の緑色コーヒー抽出物。

## 【発明の詳細な説明】

## 【0001】

【発明の属する技術分野】本発明は、緑色コーヒー抽出物およびその製造方法に関し、更に詳しくは、鮮明な緑色系の色調を有する天然物色素として利用価値を有する緑色コーヒー抽出物および、廃棄物処理の問題の軽減を可能とした、簡便、かつ、安定した上記性質を有する緑色コーヒー抽出物の製造方法に関する。

## 【0002】

【従来の技術】食品にとって、色は味、香り、テクスチャーと同様、非常に重要な品質要素であり、それを積極的に愉しむことで、「食品」文化をより味わい深いものへと発展させてきた。これらは単に食品素材そのものの色を愉しむだけに留まらず、保存、加工する際にある程度は避けられない退色を補う目的で、鮮明な色彩と優れた耐久性を有する色素も広く使用されるようになった。

近年、合成着色料である食用タール系色素は安全面による規制強化やイメージ低下から需要が低下し、反面、消費者の天然物志向と相俟って、天然物色素の需要が増大している。

【0003】

【発明が解決しようとする課題】しかしながら、天然物色素には、合成着色料に比べて鮮やかな色彩、特に鮮明な青色～緑色系の色が少なく、多様な変化に富む色彩を天然物色素により現出させるには限界があるという問題点があった。さらに、天然物色素を製造する際には、多量の天然物原料の使用が必要であり、色素を抽出した後の天然物原料を廃棄物として処理する場合の廃棄物処理に伴う環境汚染ならびに処理コスト等の面での問題が大きいという問題があった。

【0004】また、通常、コーヒー炒り豆の抽出液は赤褐色から茶褐色系の色調を呈し、一方、コーヒー生豆を熱水で抽出した場合には黄褐色の抽出液が得られることが知られている。しかし、現在までのところ、コーヒー豆より天然物色素として利用できるような鮮やか色彩を呈する抽出液を単離できたという報告はない。

【0005】また、コーヒー豆に関して、小粒や品質の悪いコーヒー豆は商品価値がないとして廃棄処分していたため、資源の有効利用という点で、コーヒー廃豆の有効利用という課題があった。

【0006】そこで本発明は、上記事情を鑑みて開発されたものであり、鮮明な緑色系の色調を呈する天然物色素として利用価値を有する緑色コーヒー抽出物を提供することにある。さらに、本発明は、廃棄物処理の問題の軽減を可能とした該緑色コーヒー抽出物の製造方法を提供することにある。

【0007】

【課題を解決するための手段】本発明者らは、上記課題を解決するべく鋭意検討した結果、通常の抽出方法を改良することにより、コーヒー豆のみを原料として用いて、該コーヒー豆を熱水中で煮沸洗浄した後、煮沸洗浄後の残渣コーヒー豆を更に熱水中で煮沸抽出することにより、天然物由来の安全性が高く、しかも、鮮明な緑色系色調を呈する天然物色素として有用なコーヒー抽出液を簡便かつ安定して製造できることを見出した。

【0008】また、さらに研究を重ねた結果、該緑色コーヒー抽出液を抽出した後の残渣コーヒー豆をコーヒー炒り豆として飲料用に再度利用できることが判明し、天然物色素の製造現場が抱える廃棄物処理の問題を軽減するのに有用であることを見出した。

【0009】即ち、本発明は、コーヒー豆を水中にて煮沸洗浄し、コーヒー豆残渣を洗浄液から分離する洗浄工程と、洗浄工程後のコーヒー豆残渣を水中で煮沸抽出し、抽出液をコーヒー豆残渣から分離する抽出工程を有することを特徴とする緑色コーヒー抽出物の製造方法に関する。

【0010】本発明の実施にあたっては、必要に応じ、前記抽出工程後に濃縮工程を有することを特徴とし、更に、必要に応じて、前記濃縮工程後に乾燥工程を有することを特徴とする緑色コーヒー抽出物の製造方法に関し、必要に応じ、前記コーヒー豆を前記洗浄工程に先立ち、粉碎処理する粉碎工程を有することを特徴とする。

【0011】さらに、本発明の実施にあたっては、前記煮沸工程における煮沸洗浄をコーヒー豆1重量部に対して5～100重量部の熱水で、1～5分行なうことを特徴とし、さらに、前記抽出工程における煮沸抽出をコーヒー豆1重量部に対して10～20重量部の熱水で、5～10分行なうことを特徴とするものである。また、前記煮沸工程を複数回行なうことを特徴とし、前記抽出工程を複数回行なうことを特徴とするものである。

【0012】ここでのコーヒー豆は、生豆又は極浅炒りした炒り豆が好ましい。また、前記生豆は必要に応じ、前記したすべての工程に先立ち、洗浄処理されるものである。

【0013】また、本発明は上記緑色コーヒー抽出物の製造方法により製造された緑色コーヒー抽出物に関する。

【0014】

【発明の実施の形態】以下、本発明を具体的に説明する。本発明の緑色コーヒー抽出物は、コーヒー豆を熱水で煮沸洗浄の後、熱水で煮沸抽出することによって得られるものである。更に、必要に応じて抽出工程後の濃縮工程を経て得られるものであり、更に、必要に応じて、濃縮工程後の乾燥工程を経て得られるものである。

【0015】本発明の原料として用いられるコーヒー豆の種類や産地に特に制限はなく、アラビカ種、ロブスタ種、リベリカ種等いずれのコーヒー豆でもよく、さらにブラジル、コロンビア産等いずれの産地のコーヒー豆も使用することができ、一種類の豆のみを単独で使用しても、ブレンドした二種以上の豆を使用しても良い。また、通常、商品価値がないとして廃棄処分されるような品質の悪いコーヒー豆または小粒のコーヒー豆であっても使用することができ、コーヒー豆の有効利用を図ることができる。

【0016】さらに、生豆、又は、生豆を焙煎したものいずれも使用することができるが、抽出効率の点から、生豆又は、極浅炒りした豆が、好ましい。具体的には、焙煎時間が3分未満であるものが好ましく使用できる。また、コーヒー生豆は洗浄していても、しなくてもよく、洗浄する場合にも、洗浄方法に特に制限はなく、水、熱水、水蒸気等により洗浄することができる。

【0017】また、使用されるコーヒー豆は粉碎していても、していなくとも良く、更に、運搬、乾燥、洗浄等の際に、一部が欠損し、商品価値が落ちたコーヒー豆を使用することも可能である。

【0018】次に、本発明の緑色コーヒー抽出物の製造

方法の概要を図1のフローチャートに基づき説明する。本発明の緑色コーヒー抽出物の製造方法は洗浄工程と抽出工程により、緑色コーヒー抽出物を得ることを特徴とするものであり、必要に応じて抽出後に濃縮すること又は濃縮後に乾燥させることを特徴とする。まず、コーヒー生豆を用意し、必要であれば予め焙煎を行なう。

【0019】まず、洗浄工程について説明する。洗浄工程はコーヒー豆を熱水中で煮沸洗浄し、煮沸洗浄後のコーヒー豆残渣を洗浄液から分離し、コーヒー豆残渣を回収することから構成される。分離された洗浄液は褐色を呈する懸濁液であった。

【0020】煮沸の手段は常法に従って行なえばよく、煮沸洗浄の際の煮沸の温度は、水が煮沸する温度でよく、好ましくは90℃以上、特に好ましくは100℃で行なう。該洗浄工程は繰り返し行なってもよく、2回以上行なうことが好ましく、特に1～2回行なうことが好ましい。特に、煮沸時間が短い場合には、複数回行なうことが好ましい。分離の手段はコーヒー残渣を洗浄液から分離できる手段であればいずれの手段を採用してもよく、例えば、デカンテーション、ろ過法等の常法に従って行なえばよいが、ろ過法を採用する場合、濾材の目が細かすぎると洗浄液中に分散する懸濁固形成分を除去できないため、適当な目の大きさを選択することが必要である。

【0021】洗浄工程における煮沸洗浄の際に使用する熱水の使用量は、例えば、煮沸洗浄時間が30秒である場合はコーヒー豆1重量部に対して5重量部以上が好ましく、特に40重量部以上が好ましいが、煮沸洗浄のスケールが大きくなりすぎると大規模な設備を要することから、経済性および実用化を考慮すると100重量部程度までの範囲で行なうことが好ましい。

【0022】また、煮沸洗浄の時間は、コーヒー豆1重量部に対して5重量部以上の熱水を用いる場合、洗浄時間は好ましくは30秒以上、特に、1分以上が好ましいが、エネルギーコスト等の経済性を考慮すると1～5分の範囲で行なうことが好ましい。

【0023】次に、抽出工程について説明する。抽出工程は、洗浄煮沸後のコーヒー豆を熱水中で煮沸洗浄し、煮沸抽出後の抽出液をコーヒー豆残渣から分離し、抽出液を回収することから構成される。回収された抽出液は緑色を呈するクリアな緑色抽出液を得ることができ、これにより、本発明の緑色コーヒー抽出物を得ることができる。

【0024】煮沸の手段は洗浄工程と同様、常法に従って行なえばよく、煮沸抽出の際の熱水の温度は、水が煮沸する温度でよく、好ましくは90℃以上、特に好ましくは100℃で行なう。該抽出工程は繰り返し行なってもよく、2回以上行なうことが好ましく、特に2～40回行なうことが好ましい。分離、回収手段は、抽出液からコーヒー残渣を分離、回収できる手段であればいずれ

の手段を採用してもよく、例えば、デカンテーション、ろ過等の常法に従って行なえばよい。

【0025】抽出工程における煮沸抽出の際使用する熱水の使用量は、例えば、煮沸抽出時間が5分である場合は、コーヒー豆1重量部に対して10重量部以上は必要であり、好ましくは、10～40重量部、特に10～20重量部の範囲で行なうことが好ましい。

【0026】また、煮沸抽出の時間は、コーヒー豆1重量部に対して20重量部の熱水を使用する場合には、抽出時間は好ましくは20分以上、特に30秒～10分の範囲で行なうことが好ましく、コーヒー豆に対して40倍量の熱水を使用する場合は、抽出時間は好ましくは3分以上、より好ましくは5分以上であるが、エネルギーコスト等の経済性を考慮すると特に5～10分の範囲で行なうことが好ましい。

【0027】以上説明した通り、本発明の製造方法は、洗浄工程と抽出工程からなっており、両工程とも熱水での煮沸を行なうものであるため、本発明により、鮮明な緑色系の色調を有する本発明の緑色コーヒー抽出物を簡便、かつ、安定して大量に製造することができる。

【0028】上記の方法で得られた緑色抽出液を濃縮することにより、濃厚緑色抽出液を得ることができる。ここで、濃縮の方法は特に制限はなく、限外ろ過又は逆浸透のような膜濃縮法、又は減圧濃縮法、凍結濃縮法等の公知の方法を採用することができる。かかる濃縮により、緑色系の色調を損なうことなく、濃厚緑色抽出液を得ることができ、濃縮により、品質保持に役立つ糖質の増加により、保存性に有意に働くことができる共に、体積の減少により取り扱いが容易となる。

【0029】さらに、上記の方法で得られた濃厚緑色抽出液は乾燥させて緑色抽出物粉体とすることができる。乾燥の方法は特に制限はなく、凍結乾燥、噴霧乾燥等の公知の方法を採用することができる。乾燥させることにより、水分含量を著しく低下させることにより、保存性に有意に働くことができると共に、体積の減少により取り扱いが容易となる。

【0030】本発明の緑色コーヒー抽出物は鮮やかな黄～黄緑系の色調を呈し、Labハンター表色系での判定では、L値が50.8、a値が11.2、b値が21.8の範囲にあり、670nm付近の波長付近で極大吸収波長を示すものを意味する。

【0031】本発明の緑色コーヒー抽出物が黄～黄緑系の色調を呈するのは、製造過程での熱水での煮沸によりコーヒー豆の含有成分に何らかの化学変化がおこったためであると推定され、クロロゲン酸といずれかの金属イオンが結合したこと起因するものであると推定される。クロロゲン酸は、多くの双子葉植物の果実、葉等に含まれ、特にコーヒー豆に多量に含まれ、コーヒー生豆に6.5～9.0%も含まれ、金属イオンおよびカフェイン等と結合する性質を有する。さらに、三価鉄イオンと

結合すると黒色化合物になり、アルカリ性ではオレンジ色を呈することが知られている。

【0032】本発明の緑色コーヒー抽出物は、天然物色素としては貴重な緑色系の色調を呈し、さらに、天然物由来であるため安全性が高いため、飲食用、化粧品用、医薬品用等の天然着色料として広い応用が期待される。特に、緑色系の天然物色素は豊富ではないので、コーヒー飲料以外の他の飲料に、本発明の緑色コーヒー抽出物をブレンドすることにより、視覚的に新鮮な印象を与え、着色効果が期待できる。

【0033】また、本発明の緑色コーヒー抽出液は、草様の弱い香りと味を有している。弱い香りと味であるため、飲食品加工に使用した際に、食品本来の風味や味を損なうことがないため、広く飲食品への利用が可能であり、飲食用の天然着色料として広い応用が期待される。

【0034】また、本発明で得られる緑色コーヒー抽出物は煮沸抽出により得られるものであるため、他の付随する工程を無菌下で行い、缶、瓶、PET等の容器に無菌充填することにより、保存可能であるが、後述の実験例2で説明するが、遮光性容器を用いて保存する等、暗所で保存することが好ましい。また、必要に応じて滅菌してもよく、滅菌の方法は、緑色コーヒー抽出物の形状に合致した手段を採用するものとし、例えば、緑色コーヒー抽出物が液体である場合は、メンブランフィルター等を用いたろ過法等、の周知の方法を採用することができる。しかし、後述の実験例3、4で説明するが、高温で長時間の滅菌は適しない。

【0035】また、本発明の緑色コーヒー抽出物を煮沸抽出した後のコーヒー豆残渣は特別な処理を施さことなく、通常のコーヒー豆と同様に処理することにより、レギュラーコーヒー、缶コーヒー、インスタントコーヒー等の製造に使用することができ、コーヒー豆の有効利用が図れるので、天然物色素の製造現場がかかえる廃棄物処理の問題を軽減することができる。ただし、緑色コーヒー抽出物の抽出後のコーヒー豆残渣を飲料用に使用する場合は、飲料用に適した品質のコーヒー豆を用いて緑\*

\*色コーヒー抽出物を製造した場合に限られることはいうまでもない。

【0036】以下、洗浄工程および抽出工程における最適な条件を検討した検討例を用いて本発明をさらに詳細に説明する

【0037】(検討例1)洗浄工程における煮沸洗浄に用いる水の好ましいコーヒー豆に対する加水比を選択するための検討を行なった。コーヒー生豆に対して水を加水比(水/豆)4、5、10、20、40、100倍で30秒間煮沸洗浄し、洗浄後のコーヒー豆残渣を洗浄液から分離した後、該コーヒー豆残渣を、加水比(水/豆)20倍で、5分間煮沸抽出して得られる本発明の緑色コーヒー抽出物の色調、極大吸収波長、670nm付近の吸光度により、煮沸洗浄に用いる熱水の好ましい加水比を判定した。結果を表1に示す。尚、本明細書中で使用する加水比(水/豆)とは、コーヒー豆に対する熱水の重量比を示すものとし、例えば、加水比(水/豆)5倍の熱水とは、1重量部のコーヒー豆に対して5重量部の熱水を意味するものとする。

【0038】色調は肉眼による評価によって判定を行うと共に、ハンターLab表色系に基いて判定を行い、L値、a値、b値は色差計により測定した。明度はL値が大きくなると明るく、小さくなると暗くなり、色度は、a値が大きくなると青みが強く、小さくなると黄みが強くなり、b値が大きくなると赤みが強く、小さくなると緑みが強くなる。極大吸収波長は、光の波長を変化させて吸光度を測定して、吸収スペクトルを得ることにより、その吸収極大を示す波長を測定することにより求めた。吸光度は吸光度計により測定し、670nm付近の波長では緑色系の色の濃さを判定でき、この値が大きい程、緑色が濃くなる。尚、表中の外観の緑色判定欄において、吸光度0.3以上で◎、吸光度0.2以上で○、吸光度が0.2以下で△、吸光度が検出限度以下の場合は×とする。

【0039】

【表1】

洗浄条件	加水比(水/豆)	4倍	5倍	10倍	20倍	40倍	100倍
	煮沸時間	30秒	←	←	←	←	←
抽出条件	加水比(水/豆)	20倍	←	←	←	←	←
	煮沸時間	5分	←	←	←	←	←
評価結果	外観の緑色判定	△	○	○	○	◎	◎
	色調	薄緑色	緑色	緑色	緑色	緑色	緑色
	極大吸収波長(nm)	674	675	674	673	673	674
	670nm付近の吸光度	0.188	0.243	0.245	0.278	0.333	0.49
	L値	78.42	84.67	85.48	74.02	76.94	73.38
	a値	-5.68	-14.7	-13.83	-21.46	-14.97	-20.96
	b値	26.08	17.96	18.11	20.47	14.77	22.4

【0040】表1をみると、加水比(水/豆)5倍以上 ※物として実施可能な緑色を示し、加水比(水/豆)40倍では、色調、緑色の濃さとも本発明の緑色コーヒー抽出※50倍以上で本発明の緑色コーヒー抽出物として実施可能な

特に好ましい緑色を示したが、加水比（水／豆）4倍では、670nm付近の吸光度が0.198であり緑の濃さが薄く、しかも、a値が-5.68であり、緑色度が低くなり、肉眼評価による色調も薄緑色であった。したがって、加水比（水／豆）4倍ではあまり好ましくなく、5倍以上、特に40倍以上のものが好ましいことが理解できる。

【0041】（検討例2）煮沸洗浄を30秒間で2回行なうことで、本発明の緑色コーヒー抽出物の作製に与える影響を検討した。検討は30秒間で2回煮沸洗浄を行なう以外は検討例1と同様に行なった。

【0042】その結果、加水比が4倍の場合も、670nm付近の吸光度が0.489、L値75.1、a値-21.23、b値18.06であり、肉眼評価でも緑色の色調を呈し、好ましく実施可能であった。5、10、20、40、100倍の場合は、検討例1と同様、肉眼評価およびハンターL a b表色系での評価とも、本発明の\*

\*緑色コーヒー抽出物として実施可能な緑色を呈し、緑色の濃さも本発明の緑色コーヒー抽出物として実施可能な濃さを示し、670nm付近の吸光度は、それぞれ、0.352、0.403、0.405、0.387、0.512であり、一回洗浄の検討例1と比較するといずれの場合も緑色が濃くなることが判明した。したがって、加水比（水／豆）4倍であっても、30秒の煮沸洗浄を2回行なうことにより、実施可能であり、また、煮沸洗浄は30秒の煮沸洗浄の場合、1回よりも2回行なうことが好ましいことが判明した。

【0043】（検討例3、4、5、6）洗浄工程における好ましい煮沸洗浄の時間を選択するため検討を行なった。検討例3では、加水比（水／豆）は5倍で、30秒、1分、5分、30分で煮沸洗浄する以外は、検討例1と同様に行なった。その結果を表2に示す。

【0044】

【表2】

洗浄条件	加水比(水/豆)	5倍	5倍	5倍	5倍
	煮沸時間	30秒	1分	5分	30分
抽出条件	加水比(水/豆)	20倍	20倍	20倍	20倍
	煮沸時間	5分	5分	5分	5分
評価結果	外観の緑色判定	○	◎	◎	◎
	色調	緑色	黄緑色	緑色	緑色
	極大吸収波長(nm)	675	675	675	673
	670nm付近の吸光度	0.243	0.36	0.434	0.355
	L値	84.67	79.51	77.39	80.06
	a値	-14.7	-17.74	-19.87	-17.46
	b値	17.96	19.37	19.46	15.81

【0045】表2より、緑色の濃さが、煮沸洗浄時間が30秒では、やや薄い、色調は肉眼評価およびハンターL a b表色系での評価とも、いずれの煮沸洗浄時間でも本発明の緑色コーヒー抽出物として実施可能な緑色を呈した。したがって、加水比（水／豆）は5倍では、30秒間以上、特に1分間以上が好ましいエネルギーコスト等の経済面を考慮すると1～5分が特に好ましい。

【0046】検討例4は、加水比（水／豆）は20倍で煮沸洗浄する以外は、検討例3と同様に行なった。その結果、いずれの煮沸洗浄時間でも、肉眼評価での色調は緑色を呈し、670nm付近の波長での吸光度が30秒、1分、5分、30分間の煮沸でそれぞれ、0.276、0.325、0.447、0.342であり、やや30秒の場合は緑色が薄い、ハンターL a b表色系評価での色調はいずれの場合も本発明の緑色コーヒー抽出物として実施可能な好ましい緑色の色調を呈することが判明した。したがって、加水比（水／豆）20倍では、30秒以上が好ましく実施可能であることが理解できるが、エネルギーコスト等の経済面を考慮すると1～5分が特に好ましい。

【0047】検討例5では、加水比（水／豆）は40倍※50

30※で煮沸洗浄する以外は、検討例3と同様に行なった。その結果、いずれの煮沸洗浄時間でも、肉眼評価での色調は緑色を呈し、670nm付近の波長での吸光度が30秒、1分、5分、30分間の煮沸でそれぞれ、0.333、0.484、0.534、0.346であり、緑色の濃さはいずれの場合も本発明の緑色コーヒー抽出物として実施可能な濃さであり、ハンターL a b表色系評価でも、いずれの煮沸洗浄時間においても好ましい緑色の色調を呈することが判明した。したがって、加水比（水／豆）は40倍では、30秒以上が好ましく実施可能であることが理解できる。

【0048】検討例6では、加水比（水／豆）は100倍で煮沸洗浄する以外は、検討例3と同様に行なった。その結果は、いずれの煮沸時間でも、肉眼評価での色調は緑色を呈し、670nm付近の波長での吸光度が30秒、1分、5分、30分間の煮沸でそれぞれ、0.490、0.449、0.476、0.355であり、緑色の濃さはいずれの場合も本発明の緑色コーヒー抽出物として実施可能な濃さであり、ハンターL a b表色系評価でも、いずれ煮沸洗浄時間においても好ましい緑色の色調を呈することが判明した。したがって、加水比（水／

豆)は100倍では、30秒以上が好ましく実施可能であることが理解できる。

【0049】(検討例7)抽出工程における煮沸抽出する熱水の好ましいコーヒー豆に対する加水比を選択するための検討を行なった。熱水を加水比(水/豆)20倍で5分間煮沸洗浄し、洗浄液を廃棄した後、加水比(水\*

\* /豆)5、10、20、40、100倍で、5分間煮沸抽出してコーヒー抽出物を得、煮沸抽出に使用する好ましい熱水の加水比(水/豆)を検討例1と同様に判定した。

【0050】

【表3】

洗浄条件	加水比(水/豆)	20倍	20倍	20倍	20倍	20倍
	煮沸時間	5分	5分	5分	5分	5分
抽出条件	加水比(水/豆)	5倍	10倍	20倍	40倍	100倍
	煮沸時間	5分	5分	5分	5分	5分
評価結果	外観の緑色判定	×	◎	◎	○	△
	色調	茶褐色	緑色	緑色	緑色	薄緑色
	極大吸収波長(nm)	394	675	673	670	673
	670nm付近の吸光度	—	0.393	0.303	0.272	0.11
	L値	77.72	76.58	81.78	80.58	90.11
	a値	-1.65	-16.66	-17.4	-14.82	-6.87
	b値	22	21.8	18.99	21.41	13.58

【0051】表3より、加水比(水/豆)10倍以上ではいずれも肉眼評価およびハンターL a b表色系評価では緑色の色調を呈したが、加水比(水/豆)40倍以上では、670nm付近での吸光度が低下し、やや緑色が薄くなり、加水比(水/豆)100倍では、670nm付近での吸光度が低下し、a値も大きくなることが判明した。また、加水比(水/豆)5倍では、肉眼評価での色調は茶褐色を呈し、緑色コーヒー抽出物を取得することができなかった。したがって、加水比(水/豆)は最低限10倍以上は必要であり、10~40倍が好ましく、※

※特に、10~20倍が好ましいことが理解できる。

20 【0052】(検討例8、9、10)抽出工程における好ましい煮沸抽出の時間を選択するため検討を行なった。検討例8では、加水比(水/豆)20倍で、30秒、3分、5分、10分、20分、30分間煮沸する以外は検討例7と同様に行なった。この結果を表4に示す。

【0053】

【表4】

洗浄条件	加水比(水/豆)	20倍	20倍	20倍	20倍	20倍	20倍
	煮沸時間	5分	5分	5分	5分	5分	5分
抽出条件	加水比(水/豆)	20倍	20倍	20倍	20倍	20倍	20倍
	煮沸時間	30秒	3分	5分	10分	20分	30分
評価結果	外観の緑色判定	◎	◎	◎	◎	○	×
	色調	緑色	緑色	緑色	緑色	緑色	褐色
	極大吸収波長(nm)	675	673	675	675	672	393
	670nm付近の吸光度	0.358	0.495	0.708	0.854	0.338	2.874
	L値	79.36	70.43	64.74	60.03	70.03	66.84
	a値	-14.18	-16.63	-21.49	-25.49	-11.17	-5.41
	b値	10.55	15.45	13.79	17.51	27.47	28.74

【0054】表4より、煮沸抽出の時間が20分までは緑色の濃さ、色調ともに本発明の緑色コーヒー抽出物として実施可能な緑色の濃さ、および、緑色を呈し、特に、5、10分では特に緑色の濃い緑色コーヒー抽出物を製造できることが判明した。一方、30分では超えると肉眼評価での色調が褐色となり、緑色コーヒー抽出物を得ることができず、また、20分では、肉眼評価での色調は緑色を呈するものの、a値が大きくなり、やや緑色が低くなることが判明した。したがって、20分間★

★以内が好ましく、特に30秒~10分間の範囲が好ましいことが理解できる。

【0055】検討例9では、加水比(水/豆)40倍で、30秒、3分、5分、10分、20分、30分間煮沸抽出する以外は検討例8と同様に行なった。この結果を表5に示す。

【0056】

【表5】

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洗浄条件	加水比(水/豆)	20倍	20倍	20倍	20倍	20倍	20倍
	煮沸時間	5分	5分	5分	5分	5分	5分
抽出条件	加水比(水/豆)	40倍	40倍	40倍	40倍	40倍	40倍
	煮沸時間	30秒	3分	5分	10分	20分	30分
評価結果	外観の緑色判定	△	○	◎	◎	◎	◎
	色調	薄緑色	薄緑色	緑色	緑色	緑色	緑色
	極大吸収波長(nm)	673	673	675	673	673	674
	670nm付近の吸光度	0.261	0.403	0.851	0.564	0.640	0.838
	L値	82.99	75.49	60.74	67.3	65.61	65.23
	a値	-11.01	-14.25	-24.8	-18.32	-21.05	-21.3
	b値	10.04	12.83	15.57	16.32	16.56	17.53

【0057】表5より、煮沸抽出の時間が5分以上では緑色の濃さ、色調ともに本発明の緑色コーヒー抽出物として実施可能な緑色の濃さおよび緑色であり、特に、5分では特に緑色の濃い緑色コーヒー抽出物を製造できることが判明した。一方、3分以下では、a値がおおくなり、やや緑色度が低くなり、更に、30秒では670nm付近の波長での吸光度が低下し、緑色が薄くなることが判明した。したがって、3分間以上が好ましく、5分

\*スト等の経済性を考慮すると、特に5分～10分間の範囲が好ましいことが理解できる。

【0058】検討例10では、加水比(水/豆)100倍で、30秒、3分、5分、10分、20分、30分間煮沸する以外は検討例8と同様に行なった。この結果を表6に示す。

【0059】

【表6】

洗浄条件	加水比(水/豆)	20倍	20倍	20倍	20倍	20倍
	煮沸時間	5分	5分	5分	5分	5分
抽出条件	加水比(水/豆)	100倍	100倍	100倍	100倍	100倍
	煮沸時間	10分	20分	30分	60分	80分
評価結果	外観の緑色判定	×	△	△	○	×
	色調	ほぼ無色	薄緑色	薄緑色	緑色	暗緑色
	極大吸収波長(nm)	666	664	666	664	622
	670nm付近の吸光度	0.091	0.168	0.211	0.284	0.441
	L値	89.33	76.23	72.95	71.69	59.3
	a値	-3.21	-0.368	-7.13	-9.21	-7.42
	b値	11.19	14.47	23.41	26.96	27.05

【0060】表6をみると、60分煮沸抽出すると、緑色コーヒー抽出物を得ることができたが、10、90分では、肉眼評価による色調はそれぞれ、ほぼ無色、黒味を帯びた暗緑色を呈し、緑色コーヒー抽出物を得ることができなかった。また、20、30分の煮沸では、670nm付近の波長で吸光度はそれぞれ、0.166、0.211で緑色の濃さが薄く、a値はそれぞれ、-0.368、-7.13とおおくなり、緑色度が低いことが判明し、肉眼評価での色調も薄緑色を呈した。したがって、加水比(水/豆)100倍では、60分間煮沸すると、緑色コーヒー抽出物を得ることができるが、※

※エネルギーコスト等の経済性を考慮すると好ましく実施可能であるとはいえなかった。

【0061】(検討例11、12、13、14)抽出工程で煮沸抽出回数が、緑色コーヒー抽出物の生成に与える影響を検討した。コーヒー生豆に対して熱水を加水比(水/豆)20倍で5分間煮沸洗浄し、洗浄液を廃棄した後、加水比(水/豆)20倍の熱水中で、5分間煮沸抽出を1、2、3回行なって得られる抽出物を検討例1と同様に判定した。その結果を表7に示す。

【0062】

【表7】



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洗浄条件	加水比(水/豆)	20倍	20倍	20倍
	煮沸時間	5分	5分	5分
抽出条件	加水比(水/豆)	20倍	20倍	20倍
	煮沸時間	5分・1バッチ目	5分・2バッチ目	5分・3バッチ目
評価結果	外観の緑色判定	◎	◎	◎
	色調	緑色	緑色	緑色
	極大吸収波長(nm)	666	672	670
	670nm付近の吸光度	0.418	0.501	0.398
	L値	72.36	64.63	72.4
	a値	-14.88	-18.18	-15.38
	b値	13.54	18.87	22.62

【0063】その結果、緑色コーヒー抽出物はバッチを繰り返すことによっても得られ、特に2バッチ目が特に緑色コーヒー抽出物の緑色系の色調が濃く、また、緑色度が高いことが理解できると共に、少なくとも2回抽出を行なうことが好ましいことが理解できる。

【0064】検討例12では、抽出時間を10分で煮沸抽出する以外は検討例11と同様に行なった。この結果、670nm付近の吸光度は1バッチ目、2バッチ目、3バッチ目でそれぞれ、0.587、0.785、0.694であり、a値は、-16.07、-23.54、-20.82で、b値は14.47、22.63、23.47であり、肉眼評価での色調もいずれの場合も本発明の緑色コーヒー抽出物として実用可能な緑色を呈し、特に2バッチ目で緑色の濃さ、色調とも好適な結果を示した。したがって、緑色コーヒー抽出物はバッチを繰り返すことによっても得られ、特に2バッチ目が特に緑色コーヒー抽出物の緑色が濃く、また、緑色度が高いことが理解できる。

【0065】検討例13では、加水比(水/豆)40倍で煮沸抽出する以外は検討例11と同様に行なった。この結果、670nm付近の吸光度は1バッチ目、2バッチ目、3バッチ目でそれぞれ、0.235、0.245、0.164であり、緑色の濃さが薄く、a値がそれぞれ、-9.51、-10.88、-7.14といずれの場合も緑色度が低くなることが示めされたが、肉眼評価での色調はいずれも緑色の色調を呈した。したがって、緑色コーヒー抽出物はバッチを繰り返すことによっても得られ、特に2バッチ目が特に緑色コーヒー抽出物の緑色が濃く、また、緑色度が高いことが理解できる。

【0066】検討例14では、抽出時間を10分で煮沸抽出する以外は検討例13と同様に行なった。670nm付近の吸光度は1バッチ目、2バッチ目、3バッチ目でそれぞれ、0.391、0.401、0.333であり、a値は-13.15、-15.54、-9.43であり、b値は13.06、22.63、19.80であり、肉眼評価での色調もいずれの場合も本発明の緑色コーヒー抽出物として実用可能な緑色を呈し、特に2バッチ目

\*チ目で緑色の濃さ、色調とも好適な結果を示した。したがって、緑色コーヒー抽出物はバッチを繰り返すことによっても得られ、特に2バッチ目が特に緑色コーヒー抽出物の緑色が濃く、また、緑色度が高いことが理解できる。

【0067】(検討例15) コーヒー豆の焙煎が、緑色コーヒー抽出物の作製に与える影響を検討した。コーヒー抽出物の作製は検討例1と同様に行なうもとし、焙煎を行なわないコーヒー生豆100gと、1、2、3、4分焙煎したコーヒー炒り豆100gを用いて、煮沸洗浄を加水比(水/豆)20倍、2000gの熱水で、100℃、10分間行い、煮沸抽出は加水比(水/豆)20倍、2000gの熱水で、100℃、5分間で11回行なった。得られたコーヒー抽出物の色調及び、670nm付近の吸光度を測定することにより判定を行なった。また、それぞれの焙煎値を求め、焙煎時間だけでなく、焙煎値によっても緑色コーヒー抽出物の生成に与える影響を検討した。なお、焙煎値はCOLOR AND COLOR DIFFERENCE METER MODEL 1001DP(日本電色製)により測定した。その結果を図2、図3、図4に示す。

【0068】図2は焙煎時間および焙煎度と670nmの波長での吸光度との関係を示す図であり、図3は焙煎時間と明度(L値)の関係を示す図であり、670nmの吸光度、図4は焙煎時間と色度(a値、b値)の関係を示す図である。

【0069】図2より、焙煎時間が2分までは、670nm付近の波長の吸光度が上昇し、緑色コーヒー抽出物の緑色の濃さは焙煎が進むにつれ、濃くなり、焙煎時間が3分を超えると、670nm付近の波長の吸光度が3分の1にまで低くなり、緑色コーヒー抽出物の緑色の濃さが薄くなることが判明した。図3より、焙煎時間が2分まではL値にほとんど変動はなく、焙煎時間が3分を超えると、L値が大きくなり、また、図4より、焙煎2分まではa値、b値もほとんど変動はないが、焙煎時間が3分を超えると、a値、b値ともに大きくなること確認された。したがって、焙煎時間が3分を超えると、色調に変化がでることが確認され、焙煎時間は3分未満で行なうことが好ましいことが判明した。

【0070】

【実施例】

【0071】以下に、本発明を実施例により本発明を具体的に説明するが、本実施例により本発明が限定されるものではない。

【0072】（実施例1）2分30秒間、生豆を極浅炒りしたコーヒー炒り豆800gを2000gの熱水中、100℃で10分間煮沸洗浄を行い、洗浄後のコーヒー豆残渣を洗浄液から分離する洗浄工程を7回行い、洗浄液を回収し、廃棄した。このとき、洗浄液は褐色の懸濁液であった。その後、上記コーヒー豆残渣を2000gの熱水中、100℃で5分間煮沸抽出し、抽出液をコーヒー豆残渣から分離する工程を6回行い、コーヒー抽出液を回収した。得られたコーヒー抽出液の官能評価を色、味、臭いの3項目について行なう共に、極大吸収波長を検索した。その結果、黄～黄緑色を呈し、草様の弱い香りと味を有しているとの評価を得ることができ、視覚による色調評価と合致するように670nm付近に吸収極大を示した。以上の結果より、天然物色素としては貴重な緑色系の色調を有する本発明の緑色コーヒー抽出物を得ることができた。

【0073】（実施例2）実施例1の方法に準じ、コーヒー生豆を加水比（水/豆）20倍の熱水で、100℃で5分間の煮沸洗浄よりなる洗浄工程および洗浄後のコーヒー豆残渣を加水比（水/豆）20倍の熱水で、100℃で5分間の煮沸抽出によりなる抽出工程を経て、本発明の緑色コーヒー抽出物を得た。洗浄工程および抽出工程はそれぞれ1回行った。

【0074】（実施例3）緑色コーヒー抽出物の性質  
実施例1の方法と準じ、コーヒー生豆100gを2000gの熱水で、100℃で10分間の煮沸洗浄よりなる洗浄工程、および、洗浄工程後のコーヒー豆残渣を2000gの熱水中、100℃で5分間の煮沸抽出よりなる抽出工程を経て、緑色抽出液を得た。ここで、洗浄工程は7回、抽出工程は11回行った。さらに、該抽出液を体積が4分の1になるまで濃縮を行い、濃厚緑色抽出液を得た。洗浄液、緑色抽出液、濃厚緑色抽出液の可溶性固形成分、BRIX値およびpHを測定した。BRIX度は市販の屈折計により、pHは市販のpHメーターにより測定した。

【0075】その結果、洗浄液、緑色抽出液、濃厚緑色抽出液の可溶性成分はそれぞれ、5.24～5.25%、0.17～0.18%、2.52～2.53%であり、BRIX値はそれぞれ6.56、0.22、3.12であり、pHはそれぞれ5.76、7.09、8.17であった。

【0076】次に、抽出原液である緑色抽出液と濃厚緑色抽出液を詳細に比較した。具体的には、色調、極大吸収波長および極大吸収波長での吸光度により比較した。色調、極大吸収波長および吸光度の測定方法は検討例1

と同様の方法で行なった。

【0077】その結果、緑色抽出液と濃厚緑色抽出液の極大吸収波長はそれぞれ、672nmと666nmとはほぼ同値であり、吸光度はそれぞれ、0.65、1.60であったことから、色素成分は同一であるが、濃縮により色素成分濃度が高くなったことが理解される。また、緑色抽出液と濃厚緑色抽出液のL値はそれぞれ65.

3、28.8、a値は-21.7、-19.4、b値は10.8、14.6であり、a値、b値に大きな変動は無いが、L値が小さくなったことから、色調が黒変することが確認されたが、これは色素成分が濃くなったことに起因するものであることが理解される。以上の結果より、濃縮により緑色色素成分が変化することがなく、濃厚緑色抽出液を得ることができる。

【0078】（実験例1）耐酸、アルカリ性試験

実施例3で得られた緑色コーヒー抽出物に対するpHの与える影響を検討した。実施例3で得られた緑色抽出液をpH2～10に調整し、その退色の度合いを、670nm付近の波長の吸光度測定して判定すると共に色調の変化を判定した。吸光度が低下するほど退色しやすいと判定するものとし、また、色調の変化はハンターLab表色系に基き評価するものとし、色差計により各pHにおける緑色コーヒー抽出物のL値、a値、b値を測定した。その結果を図5、図6、図7に示す。

【0079】図5は吸収波長670nmの波長によりpHの影響を示す図であり、図6は明度L値によりpHの影響を示す図であり、図7は色度（a値、b値）によりpHの影響を示す図である。

【0080】図5、6、7より、670nm付近の波長の吸光度、色調とも、pH6～8の中性領域では変化はなく、緑色コーヒー抽出物は安定することが確認された。一方、酸性条件では、吸光度の低下が確認され、特にpH2～3ではその傾向が顕著であり、a値は、+側に移行し、b値も大きくなり、赤黄色を呈することが確認された。一方、アルカリ条件では、吸光度の変化は殆ど確認されなかったが、L値が低下し、やや黒変すると共に、b値が大きくなり、やや黄変することが確認された。以上の結果より、本発明の緑色コーヒー抽出物は、中性及びアルカリ性の飲食品等の着色に利用するに適しており、特に中性の飲食品等の着色に利用するに適していることが確認された。

【0081】（実験例2）耐光性試験

実施例3で得られた緑色コーヒー抽出物に対する光の与える影響を検討した。具体的には、本試験例は緑色コーヒー抽出物の蛍光灯照射における光安定性を確認するものである。実施例3で得られた緑色抽出液に対し、1100ルクスの環境下で1、2、3、4、96、121時間連続照射を行なった。退色の度合い、及び、色調の変化を試験例1と同様の方法で判定した。コントロールとして光照射を行わない緑色抽出液を用いた。その結

果を図8、図9、図10に示す。

【0082】図8は吸収波長670nmの吸光度により光の影響を示す図であり、図9は明度L値によりpHの光の影響を示す図であり、図10は色度(a値、b値)により光の影響を示す図である。

【0083】図8により、670nm付近の波長の吸光度は4時間照射までは、ほとんど変動しないが、96時間以上の光照射で、吸光度が0となることが確認された。図9により、L値は光照射の影響はなく、図10により、96時間以上の照射でa値は+方向に変化し、緑色コーヒ抽出物が赤変することが、一方、b値は大きくなり、緑色コーヒ抽出物がやや黄変することが確認された。したがって、本発明の緑色コーヒ抽出物は4時間の光照射では安定していたことから、ある程度の耐光性を示すことが判明した。しかしながら、蛍光灯下に長時間置くことにより、退色することも確認されたため、褐色瓶等の遮光性の容器に保存する等、暗所に保存することが好ましい。

#### 【0084】(実験例3)耐熱性試験1

実施例3で得られた緑色コーヒ抽出物に対する熱の影響を検討した。実施例3で得られた緑色抽出液をインキュベーター中で、55℃に、1、2、3、4、96、121時間保温した。退色の度合い、及び、色調の変化を試験例1と同様の方法で判定した。コントロールとして、保温を行わない緑色抽出液を用いた。その結果を図11、図12、図13に示す。

【0085】図11は吸収波長670nmの波長により熱の影響を示す図であり、図12は明度L値により熱の影響を示す図であり、図13は色度(a値、b値)による緑色コーヒ抽出物

	結果(色)	色調	極大吸収波長(nm)	670nm付近の吸光度	L値	a値	b値
処理前	○	緑色	667	0.514	62.42	-10.59	13.46
処理後	○	暗緑色	666	0.891	39.52	-10.07	28.8

#### ニューグリーンASNo. 15(0.3%添加)

	結果(色)	色調	極大吸収波長(nm)	670nm付近の吸光度	L値	a値	b値
処理前	○	緑色	597	0.604	59.02	-15.26	26.57
処理後	○	緑色	596	0.53	59.78	-13.37	26.25

【0090】表8より、熱を与えることにより、極大吸収波長での吸光度が本発明の緑色コーヒ抽出物では高くなり、ニューグリーンASNo. 15(0.3%添加)ではほとんど変化がなかった。また、本発明の緑色コーヒ抽出物の明度L値は小さくなり、黒変することが、また、b値は若干、大きくなるが判明した。一方、ニューグリーンASNo. 15(0.3%添加)は、L値、b値ともほとんど変化しなかった。以上の結果より、100℃、20分の処理により、本発明の緑色コーヒ抽出物は黒変することが確認されたが、ニューグリー※50

\*り熱の影響を示す図である。

【0086】図11より、670nm付近の波長の吸光度は4時間保温までは、ほとんど変動せず、96時間以上の保温で、吸光度0となることが確認された。図12より、L値は保温によりやや低下し、黒変することが確認された。また、図13より、a値は96時間以上の保温で+方向に変化し、赤変することが、b値は96時間以上の保温で大きくなり、黄変することが確認された。したがって、本発明の緑色コーヒ抽出物は4時間までの保温では安定していたことから、ある程度の耐熱性を示すことが判明した。しかしながら、高温下で長時間おくことと退色することも確認されたため、高温条件下に長時間おくことは好ましくないことも判明した。

#### 【0087】(実験例4)耐熱性試験2

本発明の緑色コーヒ抽出物と市販の天然物色素の耐熱性を比較した。具体的には、本発明の実施例2で製造された緑色コーヒ抽出物とニューグリーンASNo. 15(0.3%添加)を100℃で20分間処理することにより、両者の耐熱性を比較した。退色の度合い、および色調の変化を処理前と処理後の670nmの吸光度、色調を比較することにより判定を行なった。結果を表8に示す。

【0088】対照として用いたニューグリーンASNo. 15(0.3%添加)はベニバナ黄色素とクチナシ青色素を調合したものであり、鮮明な緑色を呈し、熱に対して比較的安定な天然物色素製剤である。

【0089】

【表8】

※ーASNo. 15(0.3%添加)は色調に変化を生じないことが確認された。

【0091】したがって、本発明の緑色コーヒ抽出物の耐熱性はニューグリーンASNo. 15(0.3%添加)より若干劣ることが判明したが、本発明の緑色コーヒ抽出物も100℃、20分により、やや黒変するものの、赤-緑の色調の変化はなく、吸光度の低下も認められなかったことから、ある程度の耐熱性を有することが判明したので、熱を利用した食品加工に本緑色コーヒ抽出物の利用への可能性を示唆するものである。

【0092】

【発明の効果】本発明により、天然物由来の鮮明な緑色の色調を呈する緑色コーヒー抽出物を提供でき、天然物由来であるため安全性が高く、また、鮮明な緑色系等の天然物色素は貴重であるため着色効果が期待され、飲食品用の天然着色料、または化粧品、医薬品用等の天然着色料等として広く利用が可能であり、産業上、有用である。さらに、クリアな緑色の抽出液として製造されるものであるため、沈降、分離することなく、安定に分散、保持することができるので、水を多量に含む飲食品用の天然着色料、または化粧品、医薬品等の天然着色料や繊維、紙等の染料等として広く利用が可能であり、産業上、有用である。

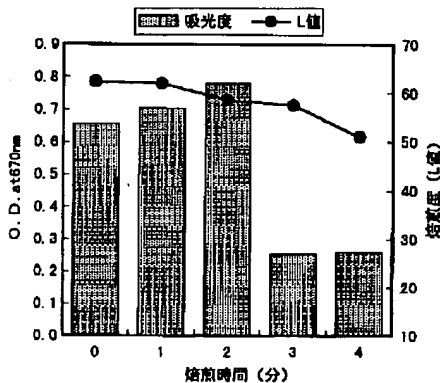
【0093】また、緑色の抽出液を抽出した後のコーヒー豆残渣を焙煎、抽出することにより飲料に適したコーヒー抽出液を得ることから、コーヒー豆の有効利用を図れると共に、従来の天然色素を得る際に生じる廃棄物の問題を軽減することができる。また、緑色コーヒー抽出物の製造に際しては、通常、廃棄処分される小粒や品質の悪いコーヒー豆を利用することができ、資源の有効利用の観点からも優れている。

【図面の簡単な説明】

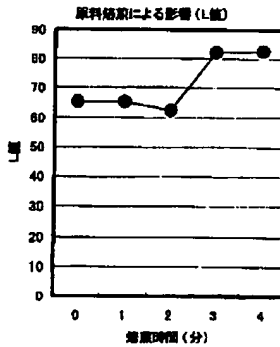
【図1】本発明の緑色コーヒー抽出物の製造方法のフローチャート。

【図2】本発明の緑色コーヒー抽出物の製造に対する焙煎の影響を焙煎時間および焙煎度と670nmの吸光度

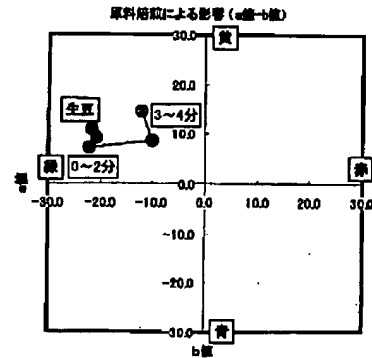
【図2】



【図3】



【図4】



との関係により示す図。

【図3】本発明の緑色コーヒー抽出物の製造に対する焙煎の影響を焙煎時間と明度（L値）の関係により示す図。

【図4】本発明の緑色コーヒー抽出物の製造に対する焙煎の影響を焙煎時間と色度（a値、b値）の関係により示す図。

【図5】本発明の緑色コーヒー抽出物に対するpHの影響を吸収波長670nmの波長により示す図。

【図6】本発明の緑色コーヒー抽出物に対するpHの影響を明度（L値）により示す図。

【図7】本発明の緑色コーヒー抽出物に対するpHの影響を色度（a値、b値）により示す図。

【図8】本発明の緑色コーヒー抽出物に対する光の影響を吸収波長670nmの波長により示す図。

【図9】本発明の緑色コーヒー抽出物に対する光の影響を明度（L値）により示す図。

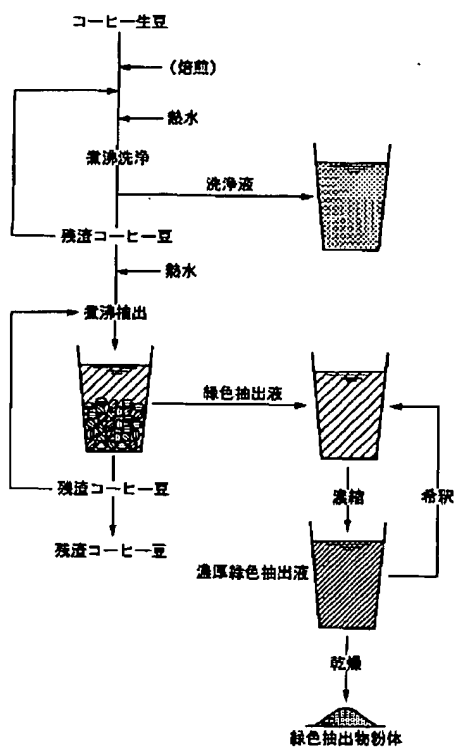
【図10】本発明の緑色コーヒー抽出物に対する光の影響を色度（a値、b値）により示す図。

【図11】本発明の緑色コーヒー抽出物に対する熱の影響を吸収波長670nmの波長により示す図。

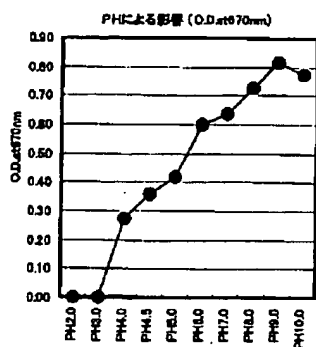
【図12】本発明の緑色コーヒー抽出物に対する熱の影響を明度（L値）により示す図。

【図13】本発明の緑色コーヒー抽出物に対する熱の影響を色度（a値、b値）により示す図。

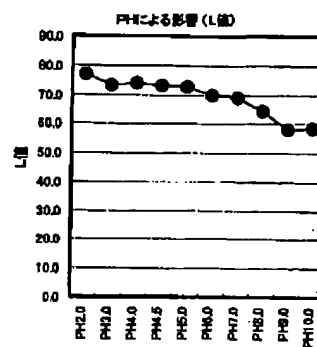
【図1】



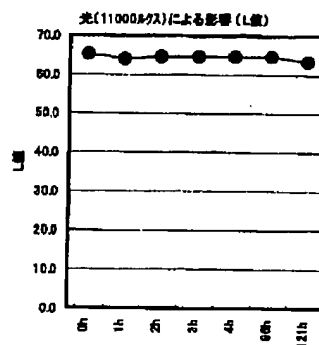
【図5】



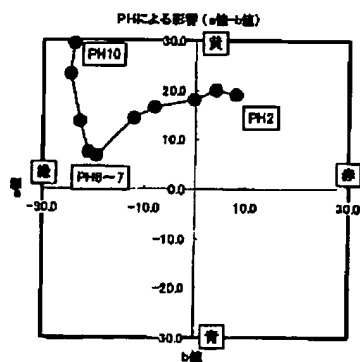
【図6】



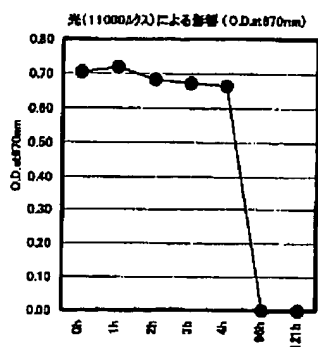
【図9】



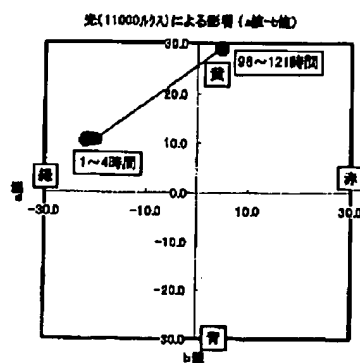
【図7】



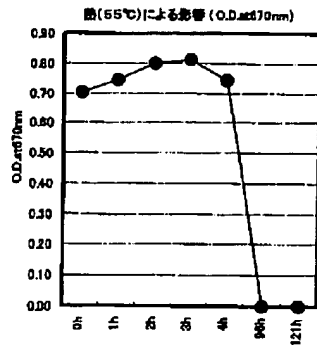
【図8】



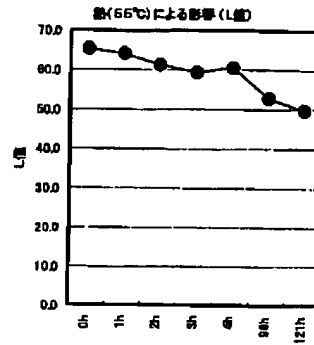
【図10】



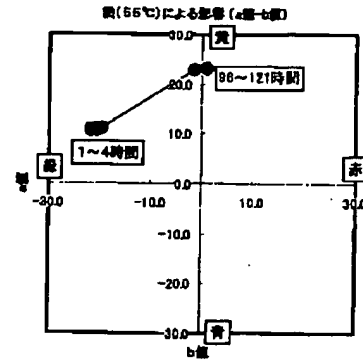
【図11】



【図12】



【図13】



フロントページの続き

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Fターム(参考) 4B018 LE03 MA07 MF01 MF06

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Oct 3, 2002

DERWENT-ACC-NO: 2003-335853

DERWENT-WEEK: 200332

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TITLE: Preparation of green coffee extract for use in food/beverage product, by boiling coffee bean in hot water, isolating coffee bean residue, extracting coffee bean residue in hot water and isolating extract

PATENT-ASSIGNEE: UCC UESHIMA KOHI KK (UCCUN)

PRIORITY-DATA: 2001JP-0087897 (March 26, 2001)

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## PATENT-FAMILY:

PUB-NO	PUB-DATE	LANGUAGE	PAGES	MAIN-IPC
<input type="checkbox"/> JP 2002285026 A	October 3, 2002		014	C09B061/00

## APPLICATION-DATA:

PUB-NO	APPL-DATE	APPL-NO	DESCRIPTOR
JP2002285026A	March 26, 2001	2001JP-0087897	

INT-CL (IPC): A23 L 1/27; C09 B 61/00

ABSTRACTED-PUB-NO: JP2002285026A

## BASIC-ABSTRACT:

NOVELTY - Preparation of green coffee extract, involves boiling coffee bean in hot water, isolating coffee bean residue, extracting the coffee bean residue in hot water and isolating the extract from the coffee bean residue.

DETAILED DESCRIPTION - An INDEPENDENT CLAIM is included for a green coffee extract.

USE - For preparing green coffee extract for use in food/beverage products, cosmetics and pharmaceuticals.

ADVANTAGE - The method enables to produce a clear green coffee extract which is dispersed uniformly in the food/beverage products has a natural coloring agent.

ABSTRACTED-PUB-NO: JP2002285026A

## EQUIVALENT-ABSTRACTS:

CHOSEN-DRAWING: Dwg.0/13

DERWENT-CLASS: D13

CPI-CODES: D03-D01B;

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[Kind of final disposal of application other than  
the examiner's decision of rejection or  
application converted registration]

[Date of final disposal for application]

[Patent number]

[Date of registration]

[Number of appeal against examiner's  
decision of rejection]

[Date of requesting appeal against examiner's  
decision of rejection]

[Date of extinction of right]

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JAPANESE

[JP,2002-285026,A]

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CLAIMS DETAILED DESCRIPTION TECHNICAL FIELD PRIOR ART EFFECT OF THE  
INVENTION TECHNICAL PROBLEM MEANS EXAMPLE DESCRIPTION OF DRAWINGS  
DRAWINGS

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[Translation done.]

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**CLAIMS**

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[Claim(s)]

[Claim 1] The manufacture approach of the green coffee extract which carries out boiling washing of the coffee beans in hot water, carries out the boiling extract of the coffee-beans residue after the washing process which separates coffee-beans residue from a penetrant remover, and a washing process in hot water, and is characterized by having the extract process which separates an extract from coffee-beans residue.

[Claim 2] The manufacture approach of the green coffee extract which carries out boiling washing of the coffee beans in hot water, and is characterized by having the washing process which separates coffee-beans residue from a penetrant remover, the extract process which carries out the boiling extract of the coffee-beans residue after a washing process in hot water, and separates an extract from coffee-beans residue, and the concentration process which condenses said extract.

[Claim 3] The manufacture approach of the green coffee extract which carries out boiling washing of the coffee beans in hot water, and is characterized by to have the washing process which separates coffee-beans residue from a penetrant remover, the extract process which carries out the boiling extract of the coffee-beans residue after a washing process in hot water, and separates an extract from coffee-beans residue, the concentration process which condenses said extract, and the desiccation process which dries concentration liquid and uses as powder.

[Claim 4] The manufacture approach of the green coffee extract according to claim 1 to 3 characterized by having the grinding process which carries out grinding processing of said coffee beans in advance of said washing process.

[Claim 5] The manufacture approach of the green coffee extract according to claim 1 to 4 characterized by performing boiling washing in said washing process with the hot water of the 5 - 100 weight section to the coffee-beans 1 weight section for 1 to 5 minutes.

[Claim 6] The manufacture approach of the green coffee extract according to claim 1 to 5 characterized by performing the boiling extract in said extract process with the hot water of 10 - 20 weight section to the coffee-beans 1 weight section for 5 to 10 minutes.

[Claim 7] The manufacture approach of the green coffee extract according to claim 1 to 6 characterized by performing said washing process two or more times.

[Claim 8] The manufacture approach of the green coffee extract according to claim 1 to 7 characterized by performing said extract process two or more times.

[Claim 9] The manufacture approach of a green coffee extract according to claim 1 to 8 that said coffee beans are the roasted beans which \*\*\*\*\* (ed) raw beans or raw beans.

[Claim 10] The manufacture approach of the green coffee extract according to claim 9 characterized by carrying out washing processing of said raw beans beforehand in advance of all the above mentioned processes.

[Claim 11] The green coffee extract which carries out boiling washing of the coffee beans in hot water, carries out the boiling extract of the coffee-beans residue after the washing process which separates coffee-beans residue from a penetrant remover, and a washing process in hot water, and is characterized

by being manufactured according to the extract process which separates an extract from coffee-beans residue.

[Claim 12] The green coffee extract which carries out boiling washing of the coffee beans in hot water, and is characterized by being manufactured according to the washing process which separates coffee-beans residue from a penetrant remover, the extract process which carries out the boiling extract of the coffee-beans residue after a washing process in hot water, and separates an extract from coffee-beans residue, and the concentration process which condenses said extract.

[Claim 13] The green coffee extract which carries out boiling washing of the coffee beans in hot water, and carries out [ having been manufactured according to the washing process which separates coffee-beans residue from a penetrant remover the extract process which carries out the boiling extract of the coffee-beans residue after a washing process in hot water, and separates an extract from coffee-beans residue, the concentration process which condenses said extract, and the desiccation process which dries concentration liquid and is used as powder, and ] as the description.

[Claim 14] The green coffee extract according to claim 11 to 13 characterized by being manufactured by having the grinding process which carries out grinding processing of said coffee beans in advance of said washing process.

[Claim 15] The green coffee extract according to claim 11 to 14 characterized by being manufactured by performing boiling washing in said washing process with the hot water of the 5 - 100 weight section to the coffee-beans 1 weight section for 1 to 5 minutes.

[Claim 16] The green coffee extract according to claim 11 to 15 characterized by being manufactured by performing the boiling extract in said extract process with the hot water of 10 - 20 weight section to the coffee-beans 1 weight section for 5 to 10 minutes.

[Claim 17] The green coffee extract according to claim 11 to 16 characterized by being manufactured by performing said washing process two or more times.

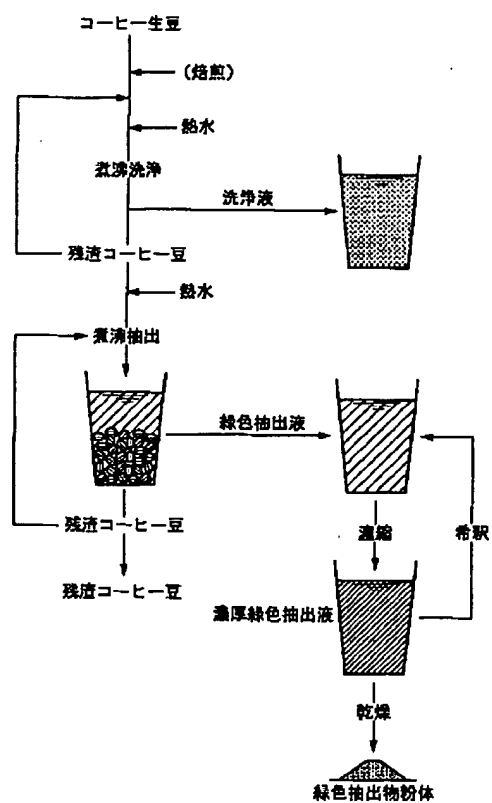
[Claim 18] The green coffee extract according to claim 11 to 17 characterized by being manufactured by performing said extract process two or more times.

[Claim 19] The green coffee extract according to claim 11 to 18 characterized by said coffee beans being the roasted beans which \*\*\*\*\* (ed) raw beans or raw beans.

[Claim 20] The green coffee extract according to claim 19 characterized by being manufactured by carrying out washing processing of said raw beans beforehand in advance of all the above mentioned processes.

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[Translation done.]

Drawing selection Representative drawing

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DETAILED DESCRIPTION

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[Detailed Description of the Invention]

[0001]

[Field of the Invention] This invention relates to the manufacture approach of the simplicity and the green coffee extract which has the stable above-mentioned property which enabled mitigation of the green coffee extract which has utility value as natural product coloring matter which has the color tone of a clear green system in more detail, and the problem of waste treatment about a green coffee extract and its manufacture approach.

[0002]

[Description of the Prior Art] for food -- a color -- the taste, aroma, and a texture -- the same -- a very important quality element -- it is -- it -- positive -- \*\*\*\*\* -- it is things, and "food" culture is experienced more and it has been made to develop into a deep thing These only \*(ed) the color of the food material itself, and it did not stop at useless \*\*, but extent which exists in case it is saved and processed is the purpose with which it compensates fading [ which is not avoided ], and the coloring matter which has clear color and the outstanding endurance also came to be used widely. In recent years, need falls from toughening of regulations according [ the edible tar system coloring matter which is synthetic dyes ] to a safety aspect, or an image fall, and, on the other hand, the need of natural product coloring matter is growing conjointly with a consumer's natural product intention.

[0003]

[Problem(s) to be Solved by the Invention] However, compared with synthetic dyes, natural product coloring matter had few skillful colors and colors of especially clear blue - a green network, and there was a trouble that there was a limitation in making the color which is rich in various change appear with natural product coloring matter in it. Furthermore, when manufacturing natural product coloring matter, there was a problem that a lot of natural product raw materials needed to be used, and the problem in fields, such as environmental pollution accompanying the waste treatment in the case of processing the natural product raw material after extracting coloring matter as trash, and processing cost, was large.

[0004] Moreover, when the extract of coffee roasted beans presents the color tone of a blackish brown system from dark reddish-brown and hot water extracts coffee student beans on the other hand, it is usually known that a yellowish brown extract will be obtained. However, there is no report that the extract which presents the vivid color which can be used as natural product coloring matter from coffee beans has been isolated, the place to current.

[0005] Moreover, since disposal was carried out noting that the coffee beans with bad granule or quality did not have commodity value about coffee beans, a technical problem called a deployment of coffee \*\*\*\* occurred in respect of the deployment of a resource.

[0006] Then, this invention is developed in view of the above-mentioned situation, and is to offer the green coffee extract which has utility value as natural product coloring matter which presents the color tone of a clear green system. Furthermore, this invention is to offer the manufacture approach of this green coffee extract that enabled mitigation of the problem of waste treatment.

[0007]

[Means for Solving the Problem] As a result of inquiring wholeheartedly in order to solve the above-mentioned technical problem, this invention persons by improving the usual extract approach After carrying out boiling washing of these coffee beans in hot water, using only coffee beans as a raw material, by carrying out the boiling extract of the residue coffee beans after boiling washing in hot water further The safety of the natural product origin was high and it found out simple and that it could stabilize and manufacture for the coffee extract useful as natural product coloring matter which moreover presents a clear green system color tone.

[0008] Furthermore, as a result of repeating research, the useful thing was found out although the problem of waste treatment that it becomes clear that it considers as coffee roasted beans and can use for a bevel use again, and the manufacture site of natural product coloring matter holds the residue coffee beans after extracting this green coffee extract is mitigated.

[0009] That is, this invention carries out boiling washing of the coffee beans underwater, carries out the boiling extract of the coffee-beans residue after the washing process which separates coffee-beans residue from a penetrant remover, and a washing process underwater, and relates to the manufacture approach of the green coffee extract characterized by having the extract process which separates an extract from coffee-beans residue.

[0010] If in charge of operation of this invention, it is characterized by to have the grinding process which carries out grinding processing of said coffee beans in advance of said washing process if needed about the manufacture approach of the green coffee extract which is characterized by to have a concentration process after said extract process if needed, and is further characterized by to have a desiccation process after said concentration process if needed.

[0011] Furthermore, if in charge of operation of this invention, it is characterized by being the hot water of the 5 - 100 weight section, and performing boiling washing in said boiling process to the coffee-beans 1 weight section, for 1 to 5 minutes, and is characterized by being the hot water of 10 - 20 weight section, and performing the boiling extract in said extract process to the coffee-beans 1 weight section, further, for 5 to 10 minutes. Moreover, it is characterized by performing said boiling process two or more times, and is characterized by performing said extract process two or more times.

[0012] Coffee beans here have raw beans or the desirable roasted beans which \*\*\*\*\* (ed). Moreover, in advance of all the above mentioned processes, washing processing of said raw beans is carried out if needed.

[0013] Moreover, this invention relates to the green coffee extract manufactured by the manufacture approach of the above-mentioned green coffee extract.

[0014]

[Embodiment of the Invention] Hereafter, this invention is explained concretely. The green coffee extract of this invention is obtained by carrying out a boiling extract with hot water, after hot water washes [ boiling ] coffee beans. Furthermore, pass the concentration process after an extract process if needed, and pass the desiccation process after a concentration process further if needed.

[0015] There is especially no limit in the class and place of production of coffee beans which are used as a raw material of this invention, and two or more sorts of beans which which coffee beans were sufficient as the ARABIKA kind, the lobster kind, the RIBERIKA kind, etc., and were further blended even if any coffee beans of a place of production could use Brazil, the product from Colombia, etc. and it used only one kind of beans independently may be used. Moreover, even if it is coffee beans with bad quality by which disposal is carried out, or the coffee beans of a granule noting that there is no commodity value, it can usually be used, and a deployment of coffee beans can be aimed at.

[0016] furthermore, the thing which roasted raw beans or raw beans -- although all can be used, the raw beans from a point or the beans which \*\*\*\*\* (ed) of extraction efficiency is desirable. Specifically, that whose roast time amount is less than 3 minutes can use it preferably. Moreover, even if it is washing coffee student beans, also when washing, there is especially no limit in the washing approach, and water, hot water, a steam, etc. can wash.

[0017] Moreover, it is also possible to use the coffee beans to which the coffee beans used did not need to be ground, either, the part suffered a loss further on the occasions, such as conveyance, desiccation,



and washing, and commodity value fell.

[0018] Next, the outline of the manufacture approach of the green coffee extract of this invention is explained based on the flow chart of drawing 1. According to a washing process and an extract process, the manufacture approach of the green coffee extract of this invention is characterized by obtaining a green coffee extract, and is characterized by making it dry after condensing after an extract if needed, or concentration. First, coffee green beans are prepared, and if required, it will roast beforehand.

[0019] First, a washing process is explained. A washing process carries out boiling washing of the coffee beans in hot water, the coffee-beans residue after boiling washing is separated from a penetrant remover, and it consists of collecting coffee-beans residue. The separated penetrant remover was suspension which presents brown.

[0020] The temperature which water boils is sufficient as the temperature of boiling in the case of boiling washing, and it is especially performed at 100 degrees C preferably 90 degrees C or more that what is necessary is just to perform the means of boiling according to a conventional method. As for this washing process, it is desirable to carry out repeatedly and to carry out twice or more, and it is desirable to carry out one to twice especially. It is desirable to carry out two or more times especially, when boiling time amount is short. Since the suspension formed element distributed in a penetrant remover cannot be removed [ if the means of separation is a means by which coffee residue is separable from a penetrant remover ] if the eye of a filtering medium is too fine when adopting filtration although what is necessary is to adopt which means, for example, just to carry out according to conventional methods, such as a decantation and filtration, it is required to choose the magnitude of a suitable eye.

[0021] Since it will require a large-scale facility if more than 5 weight sections are desirable, and the scale of boiling washing becomes large too much to the coffee-beans 1 weight section, although more than 40 weight sections are especially desirable when for example, boiling washing time amount is 30 seconds, when economical efficiency and utilization are taken into consideration, as for the amount of the hot water used in the case of boiling washing in a washing process, it is desirable to carry out in the range to 100 weight sections extent.

[0022] Moreover, 30 seconds or more, when economical efficiency, such as energy cost, is taken into consideration, as for the time amount of boiling washing, it is desirable [ when using the hot water more than 5 weight sections to the coffee-beans 1 weight section, washing time amount has 1 especially preferably desirable minutes or more but ] to carry out in the range for 1 - 5 minutes.

[0023] Next, an extract process is explained. An extract process carries out boiling washing of the coffee beans after washing boiling in hot water, separates the extract after a boiling extract from coffee-beans residue, and consists of collecting extracts. The collected extract can obtain the clear green extract which presents green, and, thereby, can obtain the green coffee extract of this invention.

[0024] The temperature which water boils is sufficient as the temperature of the hot water in the case of a boiling extract, and it is especially performed at 100 degrees C preferably 90 degrees C or more that what is necessary is just to perform the means of boiling like a washing process according to a conventional method. As for this extract process, it is desirable to carry out repeatedly and to carry out twice or more, and it is desirable to carry out 2 to 40 times especially. If separation and a recovery means are means by which coffee residue can be separated and collected from an extract, which means may be used for them, for example, they should just perform it according to conventional methods, such as a decantation and filtration.

[0025] When for example, the boiling extract time amount of the amount of the hot water used in the case of the boiling extract in an extract process is 5 minutes, more than 10 weight sections are required to the coffee-beans 1 weight section, and it is desirable preferably 10 - 40 weight section and to carry out in the range of 10 - 20 weight section especially.

[0026] moreover, when using the hot water of 20 weight sections to the coffee-beans 1 weight section, the time amount of a boiling extract Although extract time amount is desirable when using the hot water of an amount 40 times to coffee beans, and it is desirable to carry out in the range for 30 seconds - 10 minutes especially preferably 20 minutes or more as for extract time amount and it is 5 minutes or more more preferably 3 minutes or more Especially when economical efficiency, such as energy cost, is taken

into consideration, it is desirable to carry out in the range for 5 - 10 minutes.

[0027] the green coffee extract of this invention which has the color tone of a clear green system by this invention since it is that to which the manufacture approach of this invention has become from the washing process and the extract process, and both processes perform boiling with hot water as explained above -- simplicity -- and it is stabilized and can manufacture in large quantities.

[0028] A thick green extract can be obtained by condensing the green extract obtained by the above-mentioned approach. Here, especially a limit does not have the approach of concentration and it can adopt well-known approaches, such as ultrafiltration, a membrane concentration method like reverse osmosis or a vacuum concentration method, and the freezing condensing method. a thick green extract can be obtained by this concentration, without spoiling the color tone of a green system, and it can work intentionally to shelf life by the increment in the sugar which is useful to quality maintenance with concentration -- handling both becomes easy by reduction in the volume.

[0029] Furthermore, it can be made to be able to dry and the concentration green extract obtained by the above-mentioned approach can be made into green extract fine particles. Especially a limit does not have the approach of desiccation and it can adopt well-known approaches, such as freeze drying and spray drying. While being able to work intentionally to shelf life by reducing a moisture content remarkably by making it dry, handling becomes easy by reduction in the volume.

[0030] The green coffee extract of this invention presents the color tone of skillful yellow - an yellowish green system, by the judgment by the Lab hunter color coordinate system, 50.8 and a value have L value in the range of 21.8, and 11.2 and b value mean what shows absorption maximum wavelength near [ near 670nm ] wavelength.

[0031] it is the thing which it was presumed that the green coffee extract of this invention presented the color tone of a yellow - yellowish green system because a certain chemical change started to the component of coffee beans by boiling with the hot water in a manufacture process, and chlorogenic acid and one of metal ions combined and which carries out a thing reason -- it is presumed. Chlorogenic acid is contained in the fruits of many dicotyledonous plants, a leaf, etc., is contained especially in coffee beans so much, is contained in coffee student beans no less than 6.5 to 9.0%, and has the property combined with a metal ion, caffeine, etc. Furthermore, if it combines with trivalent iron ion, it will become a black compound, and presenting orange is known for alkalinity.

[0032] The green coffee extract of this invention presents the color tone of a green system precious as natural product coloring matter, and further, since it is the natural product origin, and safety is high, application large as natural coloring agent the object for eating and drinking, the object for cosmetics, for drugs, etc. is expected. Since especially the natural product coloring matter of a green system is not abundant, by blending the green coffee extract of this invention, a fresh impression is given visually and the coloring effectiveness can be expected from other drinks other than a coffee drink.

[0033] Moreover, the green coffee extract of this invention has the grass's weak aroma and weak taste. Since it is weak aroma and a taste, when it is used for eating-and-drinking article processing, in order not to spoil the flavor or taste of food original, use in an eating-and-drinking article is widely possible, and application large as natural coloring agent for eating and drinking is expected.

[0034] Moreover, since the green coffee extract obtained by this invention is what is obtained by boiling extract, it can be saved by performing under sterile the process which others accompany and carrying out aseptic to containers, such as a can, a bottle, and PET, but although the below-mentioned example 2 of an experiment explains, the thing saved in a dark place, such as saving using a protection-from-light nature container, is desirable. Moreover, you may sterilize if needed, the means corresponding to the configuration of a green coffee extract shall be adopted, for example, when a green coffee extract is a liquid, the approaches of common knowledge of \*\*, such as filtration which used the membrane filter etc., can be used for the approach of sterilization. However, although the below-mentioned examples 3 and 4 of an experiment explain, sterilization of long duration is not suitable at an elevated temperature.

[0035] Moreover, since the coffee-beans residue after carrying out the boiling extract of the green coffee extract of this invention is applicable to manufacture of real coffee, canned coffee, instant coffee, etc. and can aim at a deployment of coffee beans by processing like the usual coffee beans, without

performing special processing, the problem of the waste treatment which the manufacture site of natural product coloring matter holds is mitigable. However, it cannot be overemphasized that it is restricted when a green coffee extract is manufactured using the coffee beans of quality which were suitable for the bevel use when the coffee-beans residue after the extract of a green coffee extract was used for a bevel use.

[0036] [0037] which explains this invention to a detail further hereafter using the example of examination which examined the optimal conditions in a washing process and an extract process (Example 1 of examination) Examination for choosing the adding-water ratio to the desirable coffee beans of the water used for boiling washing in a washing process was performed. the this coffee-beans residue after carrying out boiling washing of the water for 30 seconds to coffee student beans by the adding-water ratios (water/beans) 4, 5, and 10 and 20 or 40, 100 times and separating the coffee-beans residue after washing from a penetrant remover -- a adding-water ratio (water/beans) -- by 20 times The desirable adding-water ratio of the hot water used for boiling washing was judged with the absorbance the color tone of the green coffee extract of this invention obtained by carrying out a boiling extract for 5 minutes, absorption maximum wavelength, and near 670nm. A result is shown in Table 1. in addition - that the adding-water ratio (water/beans) used by this detail letter indicates the weight ratio of hot water to coffee beans to be -- carrying out -- for example, a adding-water ratio (water/beans) -- 5 times as many hot water as this shall mean the hot water of 5 weight sections to the coffee beans of 1 weight section

[0038] While the color tone judged by evaluation by the naked eye, it judged based on the hunter Lab color coordinate system, and L value, a value, and b value were measured with the color difference meter. If lightness is bright when L value becomes large, and it becomes small, it will become dark, and \*\*\*\* will become strong if blueness of a chromaticity is strong when a value becomes large, its redness is strong when \*\*\*\* will become strong if it becomes small, and b value becomes large, and it becomes small. It asked for absorption maximum wavelength by changing the wavelength of light, measuring an absorbance and obtaining an absorption spectrum by measuring the wavelength which shows the absorption maximum. An absorbance is measured with an absorptiometer, and on the wavelength near 670nm, the thickness of the color of a green system can be judged, and green becomes deep, so that this value is large. In addition, it sets in the green judging column of the appearance of front Naka, and is O at 0.3 or more absorbances. With 0.2 or more absorbances, or less by 0.2, O and an absorbance consider as x, when \*\* and an absorbance are below sensitiveness.

[0039]

[Table 1]

洗浄条件	加水比(水/豆)	4 倍	5 倍	10倍	20倍	40倍	100倍
	煮沸時間	30秒	←	←	←	←	←
抽出条件	加水比(水/豆)	20倍	←	←	←	←	←
	煮沸時間	5 分	←	←	←	←	←
評価結果	外観の緑色判定	△	○	○	○	◎	◎
	色調	薄緑色	緑色	緑色	緑色	緑色	緑色
	極大吸収波長 (nm)	674	675	674	673	673	674
	670nm付近の吸光度	0.198	0.243	0.245	0.276	0.333	0.49
	L値	78.42	84.67	85.48	74.02	76.94	73.38
	a値	-5.68	-14.7	-13.83	-21.46	-14.97	-20.96
	b値	26.08	17.96	18.11	20.47	14.77	22.4

[0040] if Table 1 is seen -- a adding-water ratio (water/beans) -- 5 or more times -- the green which can carry out a color tone and green thickness as a green coffee extract of this invention -- being shown -- a adding-water ratio (water/beans), although the desirable green which can be carried out as a green coffee extract of this invention by 40 or more times was shown especially a adding-water ratio (water/beans) --

in 4 times, the absorbance near 670nm was 0.198, green thickness was thin, moreover, a value was -5.68, whenever [ green ] became low, and the color tone by macro-scopic evaluation was also a light green color. therefore, a adding-water ratio (water/beans) -- in 4 times, he can understand that especially the thing of 40 times or more is desirable 5 or more times not much preferably.

[0041] (Example 2 of examination) By performing boiling washing twice in 30 seconds, the effect which it has on production of the green coffee extract of this invention was considered. Examination was performed like the example 1 of examination except performing boiling washing twice in 30 seconds.

[0042] Consequently, also when a adding-water ratio was 4 times, the absorbances near 670nm are 0.489, the L value 75.1, the a value -21.23, and the b value 18.06, the color tone also with green macro-scopic evaluation was able to be presented, and it was able to carry out preferably. In the case of 5, 10, and 20 or 40,100 times, like the example 1 of examination macro-scopic evaluation and evaluation by the hunter Lab color coordinate system The green which can be carried out as a green coffee extract of this invention is presented, and the thickness which can also carry out green thickness as a green coffee extract of this invention is shown. The absorbance near 670nm Respectively, it is 0.352, 0.403, 0.405, 0.387, and 0.512, and it became clear that green became deep also in the flume gap in comparison with the example 1 of examination of 1-time washing. therefore, a adding-water ratio (water/beans) -- even if it was 4 times, it became clear by performing boiling washing for 30 seconds twice that it is desirable to be able to carry out and to perform boiling washing twice rather than 1 time in boiling washing for 30 seconds.

[0043] (Examples 3, 4, 5, and 6 of examination) It inquired in order [ in a washing process ] to choose the time amount of desirable boiling washing. In the example 3 of examination, a adding-water ratio (water/beans) is 5 times, and was performed like the example 1 of examination except carrying out boiling washing in 30 seconds, 1 minute, 5 minutes, and 30 minutes. The result is shown in Table 2.

[0044]

[Table 2]

洗淨条件	加水比(水/豆)	5 倍	5 倍	5 倍	5 倍
	煮沸時間	30秒	1 分	5 分	30分
抽出条件	加水比(水/豆)	20倍	20倍	20倍	20倍
	煮沸時間	5 分	5 分	5 分	5 分
評価結果	外観の緑色判定	○	◎	◎	◎
	色調	緑色	黄緑色	緑色	緑色
	極大吸収波長 (nm)	675	675	675	673
	670nm付近の吸光度	0.243	0.38	0.434	0.355
	L値	84.67	79.51	77.39	80.06
	a値	-14.7	-17.74	-19.87	-17.48
	b値	17.98	19.37	19.46	15.81

[0045] Although the thickness greener than Table 2 of boiling washing time amount was a little thin in 30 seconds, as for the color tone, macro-scopic evaluation and evaluation by the hunter Lab color coordinate system presented the green which can be carried out as a green coffee extract of this invention by any boiling washing time amount. Therefore, more than for 30 seconds, a adding-water ratio (water/beans) has especially 1 - 5 minutes desirable in 5 times, when the above for 1 minute takes into consideration the financial side, such as desirable energy cost, especially.

[0046] The adding-water ratio (water/beans) performed the example 4 of examination like the example 3 of examination except carrying out boiling washing by 20 times. Consequently, the color tone in macro-scopic evaluation presents green by any boiling washing time amount. By boiling whose absorbance in the wavelength near 670nm is for 30 seconds, 1 minute, 5 minutes, and 30 minutes, respectively It was 0.276, 0.325, 0.447, and 0.342 and, in the case of 30 seconds, green was a little thin, but it became clear

that the color tone in hunter Lab color-coordinate-system evaluation presented the desirable green color tone which can carry out as a green coffee extract of this invention in any case. therefore, a adding-water ratio (water/beans) -- although he can understand that 30 seconds or more can carry out preferably in 20 times, when the financial side, such as energy cost, is taken into consideration, especially 1 - 5 minutes are desirable.

[0047] In the example 5 of examination, the adding-water ratio (water/beans) was performed like the example 3 of examination except carrying out boiling washing by 40 times. Consequently, the color tone in macro-scopic evaluation presents green by any boiling washing time amount. By boiling whose absorbance in the wavelength near 670nm is for 30 seconds, 1 minute, 5 minutes, and 30 minutes, respectively It was 0.333, 0.484, 0.534, and 0.346, and green thickness is the thickness which can carry out as a green coffee extract of this invention in any case, and it became clear that hunter Lab color-coordinate-system evaluation also presented a desirable green color tone also in which boiling washing time amount. Therefore, a adding-water ratio (water/beans) can understand that 30 seconds or more can carry out preferably in 40 times.

[0048] In the example 6 of examination, the adding-water ratio (water/beans) was performed like the example 3 of examination except carrying out boiling washing by 100 times. As for the result, the color tone in macro-scopic evaluation presents green by any boiling time amount. By boiling whose absorbance in the wavelength near 670nm is for 30 seconds, 1 minute, 5 minutes, and 30 minutes, respectively It was 0.490, 0.449, 0.476, and 0.355, and green thickness is the thickness which can carry out as a green coffee extract of this invention in any case, and it became clear that hunter Lab color-coordinate-system evaluation also presented a desirable green color tone also in boiling washing time amount someday. Therefore, a adding-water ratio (water/beans) can understand that 30 seconds or more can carry out preferably in 100 times.

[0049] (Example 7 of examination) Examination for choosing the adding-water ratio to the desirable coffee beans of the hot water in an extract process which carries out a boiling extract was performed. hot water -- a adding-water ratio (water/beans) -- after carrying out boiling washing for 5 minutes by 20 times and discarding a penetrant remover, by the adding-water ratios (water/beans) 5 and 10 and 20 or 40,100 times, the boiling extract was carried out for 5 minutes, the coffee extract was obtained, and the adding-water ratio (water/beans) of the desirable hot water used for a boiling extract was judged similarly to be the example 1 of examination.

[0050]

[Table 3]

洗浄条件	加水比(水/豆)	20倍	20倍	20倍	20倍	20倍
	煮沸時間	5分	5分	5分	5分	5分
抽出条件	加水比(水/豆)	5倍	10倍	20倍	40倍	100倍
	煮沸時間	5分	5分	5分	5分	5分
評価結果	外觀の緑色判定	×	◎	◎	○	△
	色調	茶褐色	緑色	緑色	緑色	薄緑色
	極大吸収波長(nm)	394	675	673	670	673
	670nm付近の吸光度	—	0.393	0.303	0.272	0.11
	L値	77.72	76.58	81.78	80.58	90.11
	a値	-1.65	-18.88	-17.4	-14.82	-6.87
	b値	22	21.8	18.99	21.41	13.58

[0051] Table 3 -- a adding-water ratio (water/beans) -- although each presented the green color tone in macro-scopic evaluation and hunter Lab color-coordinate-system evaluation in 10 or more times -- a adding-water ratio (water/beans) -- 40 or more times -- the absorbance near 670nm -- falling -- a little -- green -- thin -- becoming -- a adding-water ratio (water/beans) -- in 100 times, the absorbance near 670nm fell and it became clear that a value also became large. moreover, a adding-water ratio

(water/beans) -- in 5 times, the color tone in macro-scopic evaluation was not able to present blackish brown, and was not able to acquire a green coffee extract. Therefore, he can understand that the adding-water ratio (water/beans) is indispensable 10 or more times, its ten to 40 times are desirable, and ten to 20 times are desirable especially.

[0052] (Examples 8, 9, and 10 of examination) It inquired in order [ in an extract process ] to choose the time amount of a desirable boiling extract. the example 8 of examination -- a adding-water ratio (water/beans) -- it carried out like the example 7 of examination by 20 times except boiling for 30 seconds, 3 minutes, 5 minutes, 10 minutes, 20 minutes, and 30 minutes. This result is shown in Table 4.

[0053]

[Table 4]

洗淨条件	加水比(水/豆)	20倍	20倍	20倍	20倍	20倍	20倍
	煮沸時間	5分	5分	5分	5分	5分	5分
抽出条件	加水比(水/豆)	20倍	20倍	20倍	20倍	20倍	20倍
	煮沸時間	30秒	3分	5分	10分	20分	30分
評価結果	外觀の緑色判定	◎	◎	◎	◎	○	×
	色調	緑色	緑色	緑色	緑色	緑色	褐色
	極大吸収波長(nm)	675	673	675	675	672	393
	670nm付近の吸光度	0.358	0.495	0.708	0.854	0.338	2.874
	L値	79.38	70.43	64.74	60.03	70.03	68.84
	a値	-14.18	-16.63	-21.49	-25.49	-11.17	-5.41
	b値	10.55	15.45	13.79	17.51	27.47	28.74

[0054] From Table 4, the green thickness to which the time amount of a boiling extract can carry out the green thickness till 20 minutes and a color tone as a green coffee extract of this invention, and green were presented, and it became clear that the deep, especially green especially green coffee extract in 5 or 10 minutes could be manufactured. On the other hand, in 30 minutes, it became clear that the color tone in macro-scopic evaluation cannot become brown if it exceeds, a green coffee extract cannot be obtained, and a value becomes large in 20 minutes although the color tone in macro-scopic evaluation presents green, and whenever [ green ] became low a little. Therefore, he can understand that less than for 20 minutes is desirable, and the range for [ 30 seconds - ] 10 minutes is especially desirable.

[0055] the example 9 of examination -- a adding-water ratio (water/beans) -- it carried [ for 3 minutes ] out like the example 8 of examination for 30 seconds by 40 times for 20 minutes for 10 minutes for 5 minutes except carrying out a boiling extract for 30 minutes. This result is shown in Table 5.

[0056]

[Table 5]

洗淨条件	加水比(水/豆)	20倍	20倍	20倍	20倍	20倍	20倍
	煮沸時間	5分	5分	5分	5分	5分	5分
抽出条件	加水比(水/豆)	40倍	40倍	40倍	40倍	40倍	40倍
	煮沸時間	30秒	3分	5分	10分	20分	30分
評価結果	外觀の緑色判定	△	○	◎	◎	◎	◎
	色調	薄緑色	薄緑色	緑色	緑色	緑色	緑色
	極大吸収波長(nm)	673	673	675	673	673	674
	670nm付近の吸光度	0.261	0.403	0.851	0.564	0.640	0.838
	L値	82.99	75.49	60.74	67.3	65.61	65.23
	a値	-11.01	-14.25	-24.8	-18.32	-21.05	-21.3
	b値	10.04	12.83	15.57	16.32	16.58	17.53

[0057] From Table 5, it is green and it became clear the green thickness to which the time amount of a boiling extract can carry out green thickness and a color tone as a green coffee extract of this invention in 5 minutes or more, and that the deep, especially green especially green coffee extract in 5 minutes could be manufactured. on the other hand -- 3 or less minutes -- a value -- \*\*\*\* -- it became, whenever [ green ] became low a little, the absorbance in the wavelength near 670nm fell in 30 seconds further, and the thing which it hears and which green becomes thin became clear. Therefore, he can understand that the above for 3 minutes is desirable, and the range for [ 5 minutes - ] 10 minutes is especially desirable if economical efficiency, such as energy cost, is taken into consideration although it can carry out more preferably in 5 minutes or more.

[0058] the example 10 of examination -- a adding-water ratio (water/beans) -- it carried out like the example 8 of examination by 100 times except boiling for 30 seconds, 3 minutes, 5 minutes, 10 minutes, 20 minutes, and 30 minutes. This result is shown in Table 6.

[0059]

[Table 6]

洗浄条件	加水比(水/豆)	20倍	20倍	20倍	20倍	20倍
	煮沸時間	5分	5分	5分	5分	5分
抽出条件	加水比(水/豆)	100倍	100倍	100倍	100倍	100倍
	煮沸時間	10分	20分	30分	60分	90分
評価結果	外観の緑色判定	×	△	△	○	×
	色調	ほぼ無色	薄緑色	薄緑色	緑色	暗緑色
	極大吸収波長(nm)	666	664	666	664	622
	670nm付近の吸光度	0.091	0.166	0.211	0.294	0.441
	L値	89.33	76.23	72.95	71.69	59.3
	a値	-3.21	-0.368	-7.13	-9.21	-7.42
	b値	11.19	14.47	23.41	26.96	27.05

[0060] Although the green coffee extract was able to be obtained when Table 6 was seen, and the boiling extract was carried out for 60 minutes, in 10 or 90 minutes, the color tone by macro-scopic evaluation was not able to present mostly colorlessness and the dark green which wore the blacking wash, respectively, and was not able to obtain a green coffee extract. moreover -- boiling for 20 or 30 minutes -- the wavelength near 670nm -- an absorbance -- the respectively green thickness at 0.166 and 0.211 -- thin -- a value -- respectively -0.368 and -7.13 -- \*\*\*\* -- as soon as it heard, it became clear that whenever [ green ] is low and the color tone in macro-scopic evaluation also presented the light green color. therefore, a adding-water ratio (water/beans) -- in 100 times, when boiled for 60 minutes, the green coffee extract could be obtained, but when economical efficiency, such as energy cost, was taken into consideration, it was not able to say [ that it can carry out by being desirable, and ].

[0061] (Examples 11, 12, 13, and 14 of examination) The count of a boiling extract considered the effect which it has on generation of a green coffee extract at the extract process. coffee student beans -- receiving -- hot water -- a adding-water ratio (water/beans) -- the adding-water ratio (water/beans) after carrying out boiling washing for 5 minutes by 20 times and discarding a penetrant remover -- 1 and the extract obtained by carrying out 2 or 3 times were similarly judged for the boiling extract for 5 minutes in 20 times as many hot water as this to be the example 1 of examination. The result is shown in Table 7.

[0062]

[Table 7]

洗浄条件	加水比(水/豆)	20倍	20倍	20倍
	煮沸時間	5分	5分	5分
抽出条件	加水比(水/豆)	20倍	20倍	20倍
	煮沸時間	5分・1バッチ目	5分・2バッチ目	5分・3バッチ目
評価結果	外観の緑色判定	◎	◎	◎
	色調	緑色	緑色	緑色
	極大吸収波長(nm)	666	672	670
	670nm付近の吸光度	0.418	0.501	0.398
	L値	72.36	64.63	72.4
	a値	-14.98	-18.18	-15.38
	b値	13.54	18.87	22.62

[0063] Consequently, while being able to understand that a green coffee extract is obtained also by repeating a batch, and especially its 2 batch eye especially is [ the color tone of the green system of a green coffee extract ] deep, and whenever [ green ] is high, if few, he can understand that it is desirable to perform an extract twice.

[0064] In the example 12 of examination, it carried out like the example 11 of examination except carrying out the boiling extract of the extract time amount in 10 minutes. Consequently, the absorbances near 670nm are 0.587, 0.785, and 0.694 by 1 batch eye, 2 batch eye, and 3 batch eye, respectively, a values are -16.07, -23.54, and -20.82, b values were 14.47, 22.63, and 23.47, the color tone in macroscopic evaluation also presented the green which can use as a green coffee extract of this invention in any case, and green thickness and a color tone showed the suitable result especially by 2 batch eye. therefore, a green coffee extract is obtained also by repeating a batch, and especially its 2 batch eye especially is [ the green of a green coffee extract ] deep, and whenever [ green ] is high -- he can understand things.

[0065] the example 13 of examination -- a adding-water ratio (water/beans) -- it carried out like the example 11 of examination except carrying out a boiling extract by 40 times. Consequently, although the absorbances near 670nm were 0.235, 0.245, and 0.164 by 1 batch eye, 2 batch eye, and 3 batch eye, respectively, and its green thickness was thin, and it was \*\* carried out of whenever [ green ] becoming low also when a values were -9.51, -10.88, and -7.14 and any, respectively, each color tone in macroscopic evaluation presented the green color tone. therefore, a green coffee extract is obtained also by repeating a batch, and especially its 2 batch eye especially is [ the green of a green coffee extract ] deep, and whenever [ green ] is high -- he can understand things.

[0066] In the example 14 of examination, it carried out like the example 13 of examination except carrying out the boiling extract of the extract time amount in 10 minutes. a values are -13.15, -15.54, and -9.43, b values were 13.06, 22.63, and 19.80, the absorbances near 670nm are 0.391, 0.401, and 0.333 by 1 batch eye, 2 batch eye, and 3 batch eye, respectively, and green thickness and a color tone showed [ the color tone in macroscopic evaluation also presented the green which can use as a green coffee extract of this invention in any case, and ] the suitable result especially by 2 batch eye. therefore, a green coffee extract is obtained also by repeating a batch, and especially its 2 batch eye especially is [ the green of a green coffee extract ] deep, and whenever [ green ] is high -- he can understand things.

[0067] (Example 15 of examination) Roast of coffee beans considered the effect which it has on production of a green coffee extract. They are 20 times and 2000g hot water. 100g of coffee student beans which perform production of a coffee extract like the example 1 of examination and which do not roast by carrying out a basis, and 100g of coffee roasted beans roasted for 1, 2, 3, and 4 minutes -- using -- boiling washing -- a adding-water ratio (water/beans) -- for 100 degrees C and 10 minutes -- carrying out -- a boiling extract -- a adding-water ratio (water/beans) -- it is 20 times and 2000g hot water, and carried out 11 times in 100 degrees C and 5 minutes. It judged by measuring the color tone of the obtained coffee extract, and the absorbance near 670nm. Moreover, each roast value was calculated,



there is only no roast time amount and the effect which gives generation of a green coffee extract also with a roast value was considered. In addition, the roast value was measured by COLOR AND COLOR DIFFERENCE METER MODEL 1001DP (Nippon Denshoku make). The result is shown in drawing 2, drawing 3, and drawing 4.

[0068] Drawing 2 is drawing showing the relation between whenever [ roast time amount and roast ], and an absorbance with a wavelength of 670nm, drawing 3 is drawing showing the relation between roast time amount and lightness (L value), and the absorbance of 670nm and drawing 4 are drawings showing the relation between roast time amount and a chromaticity (a value, b value).

[0069] It became clear that the absorbance of the wavelength near 670nm rises [ roast time amount ] till 2 minutes, the absorbance of the wavelength near 670nm would become low 1/3, and the green thickness of a green coffee extract would become thin from drawing 2 if it becomes deep and, as for the green thickness of a green coffee extract, roast time amount exceeds 3 minutes as roast progresses. When fluctuation does not almost have roast time amount in L value till 2 minutes and roast time amount exceeded 3 minutes from drawing 3, L value became large, and fluctuation did not almost have a value and b value from drawing 4 till roast 2 minutes, either, but when roast time amount exceeded 3 minutes, a value and b value became large and the thing check was carried out. Therefore, when roast time amount exceeded 3 minutes, it was checked that change appears in a color tone and it became clear that it is desirable to carry out in less than 3 minutes as for roast time amount.

[0070]

[Example]

[0071] This invention is not limited by this example although an example explains this invention for this invention concretely below.

[0072] (Example 1) Boiling washing was performed for 800g of coffee roasted beans which \*\*\*\*\* (ed) raw beans for 10 minutes at 100 degrees C among 2000g hot water for 2 minutes and 30 seconds, the washing process which separates the coffee-beans residue after washing from a penetrant remover was performed 7 times, and the penetrant remover was collected and discarded. At this time, the penetrant remover was brown suspension. Then, the boiling extract of the above-mentioned coffee-beans residue was carried out for 5 minutes at 100 degrees C among 2000g hot water, the process which separates an extract from coffee-beans residue was performed 6 times, and coffee extracts were collected. organic-functions evaluation of the obtained coffee extract is performed about a color, the taste, and three items of stinking thing -- absorption maximum wavelength was both searched. Consequently, evaluation that yellow - yellowish green are presented and it has the grass's weak aroma and weak taste could be obtained, and it was indicated near 670nm that the absorption maximum agreed with the color tone evaluation by vision. The green coffee extract of this invention which has the color tone of a green system precious as natural product coloring matter was able to be obtained from the above result.

[0073] (Example 2) the approach of an example 1 -- applying correspondingly -- coffee student beans -- a adding-water ratio (water/beans) -- the washing process which consists of boiling washing for 5 minutes at 100 degrees C with 20 times as many hot water as this, and the coffee-beans residue after washing -- a adding-water ratio (water/beans) -- pass the extract process which becomes by the boiling extract for 5 minutes at 100 degrees C with 20 times as many hot water as this -- the green coffee extract of this invention was obtained. The washing process and the extract process were performed once, respectively.

[0074] (Example 3) It applied correspondingly with the approach of the property example 1 of a green coffee extract, and the green extract was obtained through the washing process which consists of boiling washing for 10 minutes at 100 degrees C with 2000g hot water in 100g of coffee student beans, and the extract process which consists the coffee-beans residue after a washing process of a boiling extract for 5 minutes at 100 degrees C among 2000g hot water. Here, the washing process performed the extract process 11 times 7 times. Furthermore, it condensed until the volume became a quadrant about this extract, and the thick green extract was obtained. The fusibility formed element of a penetrant remover, green extract, and thick green extract, a BRIX value, and pH were measured. The degree of BRIX was

measured with the commercial refractometer, and pH was measured with the commercial pH meter. [0075] consequently, the fusibility component of a penetrant remover, green extract, and thick green extract -- respectively -- 5.24 - 5.25%, 0.17 - 0.18%, and 2.52 - 2.53% -- it is -- a BRIX value -- respectively -- 6.56 and 0. -- it was 22 and 3.12 and pH was 5.76, 7.09, and 8.17, respectively.

[0076] Next, the green extract and thick green extract which are an extract undiluted solution were compared with the detail. Specifically, the absorbance in a color tone, absorption maximum wavelength, and absorption maximum wavelength compared. The measuring method of a color tone, absorption maximum wavelength, and an absorbance was performed by the same approach as the example 1 of examination.

[0077] consequently, the absorption maximum wavelength of a green extract and a thick green extract -- respectively -- 672nm and 666nm -- almost -- equivalent -- an absorbance -- respectively -- 0. -- although the coloring matter component is the same since it was 65 and 1.60, it is understood that coloring matter constituent concentration became high by concentration. Moreover, although it was checked that a color tone is discolored in black since L value became small, although -21.7, -19.4, and b value of 65.3, 28.8, and a value is [ L value of a green extract and a thick green extract ] 10.8 and 14.6, respectively and there was no big fluctuation in a value and b value, as for this, it is understood that a coloring matter component is a thing resulting from having become deep. From the above result, a green coloring matter component cannot change with concentration, and a thick green extract can be obtained. [0078] (Example 1 of an experiment) The effect which acid-proof and pH over the green coffee extract obtained in the alkaline trial example 3 have was considered. The green extract obtained in the example 3 was adjusted to pH 2-10, and while the wavelength near 670nm carried out the spectrometry of the degree of the fading and judging it, change of a color tone was judged. It should judge with it being easy to fade, so that an absorbance falls, and change of a color tone should be evaluated based on the hunter Lab color coordinate system, and L value of the green coffee extract in each pH, a value, and b value were measured with the color difference meter. The result is shown in drawing 5, drawing 6, and drawing 7.

[0079] Drawing 5 is drawing showing the effect of pH with wavelength with an absorption wavelength of 670nm, drawing 6 is drawing showing the effect of pH with a lightness L value, and drawing 7 is drawing showing the effect of pH with a chromaticity (a value, b value).

[0080] It is changeless to the absorbance of the wavelength near 670nm, and a color tone, and it was checked from drawing 5, and 6 and 7 in the neutral region of pH 6-8 that a green coffee extract is stabilized. On the other hand, on acid conditions, the fall of an absorbance was checked, by pH 2-3, the inclination was especially remarkable, a value shifted to + side, b value also became large, and presenting red yellow was checked. On the other hand, on alkali conditions, although most change of an absorbance was not checked, while L value fell and being discolored a little in black, b value became large and yellowing a little was checked. It was checked from the above result that it is suitable for the green coffee extract of this invention being suitable for using for coloring of a neutral and alkaline eating-and-drinking article etc., and using for coloring of a neutral eating-and-drinking article etc. especially.

[0081] (Example 2 of an experiment) The effect which the light to the green coffee extract obtained in the radiationproofing test example 3 has was considered. Specifically, the example of an exam checks the light stability in the fluorescent lamp exposure of a green coffee extract. 1, 2, 3, and 4 or 96,121-hour continuous irradiation were performed under the 11000 luxs environment to the green extract obtained in the example 3. The degree of fading and change of a color tone were judged by the same approach as the example 1 of a trial. The green extract which does not perform an optical exposure as control was used. The result is shown in drawing 8, drawing 9, and drawing 10.

[0082] Drawing 8 is drawing showing the effect of light with an absorbance with an absorption wavelength of 670nm, drawing 9 is drawing showing the effect of the light of pH with a lightness L value, and drawing 10 is drawing showing the effect of light with a chromaticity (a value, b value).

[0083] It was checked that are the optical exposure of 96 hours or more, and an absorbance is set to 0 by drawing 8 although the absorbance of the wavelength near 670nm is hardly changed to an exposure for 4

hours. It was checked that L value does not have the effect of an optical exposure, a value changes with drawing 10 in the direction of + by the exposure of 96 hours or more, as for b value, it becomes large that a green coffee extract carries out the erythrochromia on the other hand, and a green coffee extract yellows a little by drawing 9. Therefore, it became clear that a certain amount of lightfastness was shown from the green coffee extract of this invention having been stable in the optical exposure of 4 hours. However, since fading by putting on the bottom of a fluorescent lamp for a long time was also checked, the thing saved in a dark place, such as saving in the container of protection-from-light nature, such as a brown bottle, is desirable.

[0084] (Example 3 of an experiment) The effect which the heat to the green coffee extract obtained in the heat resistance test 1 example 3 has was considered. the green extract obtained in the example 3 -- the inside of an incubator -- 55 degrees C -- 1, 2, and 3 -- it was kept warm for 4 or 96, 121 hours. The degree of fading and change of a color tone were judged by the same approach as the example 1 of a trial. The green extract which does not keep it warm was used as control. The result is shown in drawing 11, drawing 12, and drawing 13.

[0085] Drawing 11 is drawing showing the effect of heat with wavelength with an absorption wavelength of 670nm, drawing 12 is drawing showing the effect of heat with a lightness L value, and drawing 13 is drawing showing the effect of heat with a chromaticity (a value, b value).

[0086] From drawing 11, incubation is hardly changed for 4 hours, but the absorbance of the wavelength near 670nm is incubation of 96 hours or more, and becoming an absorbance 0 was checked. From drawing 12, L value fell a little by incubation, and being discolored in black was checked.

Moreover, it was checked that b value becomes large by incubation of 96 hours or more, and changing and carrying out the erythrochromia of the a value in the direction of + by incubation of 96 hours or more from drawing 13 yellows. Therefore, it became clear that a certain amount of thermal resistance was shown from the green coffee extract of this invention having been stable in the incubation by 4 hours. However, since fading if it sets under an elevated temperature for a long time was also checked, it was proved under the high temperature service that it is long duration Lycium chinense that it is not desirable, either.

[0087] (Example 4 of an experiment) The thermal resistance of the green coffee extract of heat resistance test 2 this invention and commercial natural product coloring matter was compared. Both thermal resistance was compared by specifically processing the green coffee extract manufactured in the example 2 of this invention, and new green ASNo.15 (0.3% addition) for 20 minutes at 100 degrees C. It judged by comparing the degree of fading and the absorbance of 670nm change of color tone processing-before, and after processing, and a color tone. A result is shown in Table 8.

[0088] new green ASNo.15 (0.3% addition) used as contrast -- carthami flos yellow coloring matter and a gardenia -- blue -- base is prepared, clear green is presented and it is comparatively stable natural product coloring matter pharmaceutical preparation to heat.

[0089]

[Table 8]

緑色コーヒー抽出物

	結果(色)	色調	極大吸収波長(nm)	670nm付近の吸光度	L値	a値	b値
処理前	○	緑色	667	0.514	62.42	-10.59	13.46
処理後	○	暗緑色	666	0.891	39.52	-10.07	28.8

ニューグリーンASNo. 15(0.3%添加)

	結果(色)	色調	極大吸収波長(nm)	670nm付近の吸光度	L値	a値	b値
処理前	○	緑色	597	0.604	59.02	-15.26	26.57
処理後	○	緑色	596	0.53	59.78	-13.37	26.25

[0090] From Table 8, by giving heat, the absorbance in absorption maximum wavelength became high

in the green coffee extract of this invention, and it was almost changeless at new green ASNo.15 (0.3% addition). Moreover, it became clear that the lightness L value of the green coffee extract of this invention became small, and, as for b value, being discolored in black became large a little again. On the other hand, as for new green ASNo.15 (0.3% addition), L value and b value hardly changed. Although it was checked by 100 degrees C and processing for 20 minutes from the above result that the green coffee extract of this invention is discolored in black, it was checked that new green ASNo.15 (0.3% addition) do not produce change to a color tone.

[0091] Therefore, although it became clear that the thermal resistance of the green coffee extract of this invention was inferior to new green ASNo.15 (0.3% addition) a little He is red although the green coffee extract of this invention is also discolored a little in black by 100 degrees C and 20 minutes. - Since it became clear that it had a certain amount of thermal resistance from there being no change of a green color tone and the fall of an absorbance not having been accepted, either The possibility to use of this green coffee extract is suggested to food processing using heat.

[0092]

[Effect of the Invention] By this invention, the green coffee extract which presents the clear green color tone of the natural product origin can be offered, and since it is the natural product origin, since it is precious, the coloring effectiveness is expected, and natural product coloring matter, such as a green system with it, can be used widely as natural coloring agent the natural coloring agent for eating-and-drinking articles or cosmetics, for drugs, etc., and is useful on industry. [ high and safety and ] [ clear ] Furthermore, since it can distribute and hold to stability, without sedimenting and dissociating since it is manufactured as a clear green extract, it can use widely as colors, such as natural coloring agent, such as natural coloring agent for eating-and-drinking articles which contains water so much or cosmetics, and drugs, and fiber, paper, etc., and is useful on industry.

[0093] moreover, the coffee extract which was suitable for the drink by roasting and extracting the coffee-beans residue after extracting a green extract -- \*\*\*\*\* -- the problem of the trash produced from things in case conventional natural coloring matter is obtained while being able to aim at a deployment of coffee beans is mitigable. Moreover, on the occasion of manufacture of a green coffee extract, coffee beans with usually bad the granule by which disposal is carried out and quality can be used, and it excels also from a viewpoint of a deployment of a resource.

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[Translation done.]

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TECHNICAL FIELD

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[Field of the Invention] This invention relates to the manufacture approach of of the simplicity and the green coffee extract which has the stable above-mentioned property which enabled mitigation of the green coffee extract which has utility value as natural product coloring matter which has the color tone of a clear green system in more detail, and the problem of waste treatment about a green coffee extract and its manufacture approach.

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PRIOR ART

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[Description of the Prior Art] for food -- a color -- the taste, aroma, and a texture -- the same -- a very important quality element -- it is -- it -- positive -- \*\*\*\*\* -- it is things, and "food" culture is experienced more and it has been made to develop into a deep thing These only \*(ed) the color of the food material itself, and it did not stop at useless \*\*, but extent which exists in case it is saved and processed is the purpose with which it compensates fading [ which is not avoided ], and the coloring matter which has clear color and the outstanding endurance also came to be used widely. In recent years, need falls from toughening of regulations according [ the edible tar system coloring matter which is synthetic dyes ] to a safety aspect, or an image fall, and, on the other hand, the need of natural product coloring matter is growing conjointly with a consumer's natural product intention.

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EFFECT OF THE INVENTION

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[Effect of the Invention] By this invention, the green coffee extract which presents the clear green color tone of the natural product origin can be offered, and since it is the natural product origin, since it is precious, the coloring effectiveness is expected, and natural product coloring matter, such as a green system with it, can be used widely as natural coloring agent the natural coloring agent for eating-and-drinking articles or cosmetics, for drugs, etc., and is useful on industry. [ high and safety and ] [ clear ] Furthermore, since it can distribute and hold to stability, without sedimenting and dissociating since it is manufactured as a clear green extract, it can use widely as colors, such as natural coloring agent, such as natural coloring agent for eating-and-drinking articles which contains water so much or cosmetics, and drugs, and fiber, paper, etc., and is useful on industry.

[0093] moreover, the coffee extract which was suitable for the drink by roasting and extracting the coffee-beans residue after extracting a green extract -- \*\*\*\*\* -- the problem of the trash produced from things in case conventional natural coloring matter is obtained while being able to aim at a deployment of coffee beans is mitigable. Moreover, on the occasion of manufacture of a green coffee extract, coffee beans with usually bad the granule by which disposal is carried out and quality can be used, and it excels also from a viewpoint of a deployment of a resource.

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TECHNICAL PROBLEM

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[Problem(s) to be Solved by the Invention] However, compared with synthetic dyes, natural product coloring matter had few skillful colors and colors of especially clear blue - a green system, and there was a trouble that there was a limitation in making the color which is rich in various change appear with natural product coloring matter in it. Furthermore, when manufacturing natural product coloring matter, there was a problem that a lot of natural product raw materials needed to be used, and the problem in fields, such as environmental pollution accompanying the waste treatment in the case of processing the natural product raw material after extracting coloring matter as trash, and processing cost, was large.

[0004] Moreover, when the extract of coffee roasted beans presents the color tone of a blackish brown system from dark reddish-brown and hot water extracts coffee student beans on the other hand, it is usually known that a yellowish brown extract will be obtained. However, there is no report that the extract which presents the vivid color which can be used as natural product coloring matter from coffee beans has been isolated, the place to current.

[0005] Moreover, since disposal was carried out noting that the coffee beans with bad granule or quality did not have commodity value about coffee beans, a technical problem called a deployment of coffee \*\*\*\* occurred in respect of the deployment of a resource.

[0006] Then, this invention is developed in view of the above-mentioned situation, and is to offer the green coffee extract which has utility value as natural product coloring matter which presents the color tone of a clear green system. Furthermore, this invention is to offer the manufacture approach of this green coffee extract that enabled relief of the problem of waste treatment.

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[Translation done.]



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**MEANS**

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[Means for Solving the Problem] As a result of inquiring wholeheartedly in order to solve the above-mentioned technical problem, this invention persons by improving the usual extract approach After carrying out boiling washing of these coffee beans in hot water, using only coffee beans as a raw material, by carrying out the boiling extract of the residue coffee beans after boiling washing in hot water further The safety of the natural product origin was high and it found out simple and that it could stabilize and manufacture for the coffee extract useful as natural product coloring matter which moreover presents a clear green system color tone.

[0008] Furthermore, as a result of repeating research, the useful thing was found out although the problem of waste treatment that it becomes clear that it considers as coffee roasted beans and can use for a bevel use again, and the manufacture site of natural product coloring matter holds the residue coffee beans after extracting this green coffee extract is mitigated.

[0009] That is, this invention carries out boiling washing of the coffee beans underwater, carries out the boiling extract of the coffee-beans residue after the washing process which separates coffee-beans residue from a penetrant remover, and a washing process underwater, and relates to the manufacture approach of the green coffee extract characterized by having the extract process which separates an extract from coffee-beans residue.

[0010] If in charge of operation of this invention, it is characterized by to have the grinding process which carries out grinding processing of said coffee beans in advance of said washing process if needed about the manufacture approach of the green coffee extract which is characterized by to have a concentration process after said extract process if needed, and is further characterized by to have a desiccation process after said concentration process if needed.

[0011] Furthermore, if in charge of operation of this invention, it is characterized by being the hot water of the 5 - 100 weight section, and performing boiling washing in said boiling process to the coffee-beans 1 weight section, for 1 to 5 minutes, and is characterized by being the hot water of 10 - 20 weight section, and performing the boiling extract in said extract process to the coffee-beans 1 weight section, further, for 5 to 10 minutes. Moreover, it is characterized by performing said boiling process two or more times, and is characterized by performing said extract process two or more times.

[0012] Coffee beans here have raw beans or the desirable roasted beans which \*\*\*\*\* (ed). Moreover, in advance of all the above mentioned processes, washing processing of said raw beans is carried out if needed.

[0013] Moreover, this invention relates to the green coffee extract manufactured by the manufacture approach of the above-mentioned green coffee extract.

[0014]

[Embodiment of the Invention] Hereafter, this invention is explained concretely. The green coffee extract of this invention is obtained by carrying out a boiling extract with hot water, after hot water washes [ boiling ] coffee beans. Furthermore, pass the concentration process after an extract process if needed, and pass the desiccation process after a concentration process further if needed.

[0015] There is especially no limit in the class and place of production of coffee beans which are used as

a raw material of this invention, and two or more sorts of beans which which coffee beans were sufficient as the ARABIKA kind, the lobster kind, the RIBERIKA kind, etc., and were further blended even if any coffee beans of a place of production could use Brazil, the product from Colombia, etc. and it used only one kind of beans independently may be used. Moreover, even if it is coffee beans with bad quality by which disposal is carried out, or the coffee beans of a granule noting that there is no commodity value, it can usually be used, and a deployment of coffee beans can be aimed at.

[0016] furthermore, the thing which roasted raw beans or raw beans -- although all can be used, the raw beans from a point or the beans which \*\*\*\*\* (ed) of extraction efficiency is desirable. Specifically, that whose roast time amount is less than 3 minutes can use it preferably. Moreover, even if it is washing coffee student beans, also when washing, there is especially no limit in the washing approach, and water, hot water, a steam, etc. can wash.

[0017] Moreover, it is also possible to use the coffee beans to which the coffee beans used did not need to be ground, either, the part suffered a loss further on the occasions, such as conveyance, desiccation, and washing, and commodity value fell.

[0018] Next, the outline of the manufacture approach of the green coffee extract of this invention is explained based on the flow chart of drawing 1. According to a washing process and an extract process, the manufacture approach of the green coffee extract of this invention is characterized by obtaining a green coffee extract, and is characterized by making it dry after condensing after an extract if needed, or concentration. First, coffee student beans are prepared, and if required, it will roast beforehand.

[0019] First, a washing process is explained. A washing process carries out boiling washing of the coffee beans in hot water, the coffee-beans residue after boiling washing is separated from a penetrant remover, and it consists of collecting coffee-beans residue. The separated penetrant remover was suspension which presents brown.

[0020] The temperature which water boils is sufficient as the temperature of boiling in the case of boiling washing, and it is especially performed at 100 degrees C preferably 90 degrees C or more that what is necessary is just to perform the means of boiling according to a conventional method. As for this washing process, it is desirable to carry out repeatedly and to carry out twice or more, and it is desirable to carry out one to twice especially. It is desirable to carry out two or more times especially, when boiling time amount is short. Since the suspension formed element distributed in a penetrant remover cannot be removed [ if the means of separation is a means by which coffee residue is separable from a penetrant remover ] if the eye of a filtering medium is too fine when adopting filtration although what is necessary is to adopt which means, for example, just to carry out according to conventional methods, such as a decantation and filtration, it is required to choose the magnitude of a suitable eye.

[0021] Since it will require a large-scale facility if more than 5 weight sections are desirable, and the scale of boiling washing becomes large too much to the coffee-beans 1 weight section, although more than 40 weight sections are especially desirable when for example, boiling washing time amount is 30 seconds, when economical efficiency and utilization are taken into consideration, as for the amount of the hot water used used in the case of boiling washing in a washing process, it is desirable to carry out in the range to 100 weight sections extent.

[0022] Moreover, 30 seconds or more, when economical efficiency, such as energy cost, is taken into consideration, as for the time amount of boiling washing, it is desirable [ when using the hot water more than 5 weight sections to the coffee-beans 1 weight section, washing time amount has 1 especially preferably desirable minutes or more but ] to carry out in the range for 1 - 5 minutes.

[0023] Next, an extract process is explained. An extract process carries out boiling washing of the coffee beans after washing boiling in hot water, separates the extract after a boiling extract from coffee-beans residue, and consists of collecting extracts. The collected extract can obtain the clear green extract which presents green, and, thereby, can obtain the green coffee extract of this invention.

[0024] The temperature which water boils is sufficient as the temperature of the hot water in the case of a boiling extract, and it is especially performed at 100 degrees C preferably 90 degrees C or more that what is necessary is just to perform the means of boiling like a washing process according to a conventional method. As for this extract process, it is desirable to carry out repeatedly and to carry out

twice or more, and it is desirable to carry out 2 to 40 times especially. If separation and a recovery means are means by which coffee residue can be separated and collected from an extract, which means may be used for them, for example, they should just perform it according to conventional methods, such as a decantation and filtration.

[0025] When for example, the boiling extract time amount of the amount of the hot water used in the case of the boiling extract in an extract process is 5 minutes, more than 10 weight sections are required to the coffee-beans 1 weight section, and it is desirable preferably 10 - 40 weight section and to carry out in the range of 10 - 20 weight section especially.

[0026] moreover, when using the hot water of 20 weight sections to the coffee-beans 1 weight section, the time amount of a boiling extract Although extract time amount is desirable when using the hot water of an amount 40 times to coffee beans, and it is desirable to carry out in the range for 30 seconds - 10 minutes especially preferably 20 minutes or more as for extract time amount and it is 5 minutes or more more preferably 3 minutes or more Especially when economical efficiency, such as energy cost, is taken into consideration, it is desirable to carry out in the range for 5 - 10 minutes.

[0027] the green coffee extract of this invention which has the color tone of a clear green system by this invention since it is that to which the manufacture approach of this invention has become from the washing process and the extract process, and both processes perform boiling with hot water as explained above -- simplicity -- and it is stabilized and can manufacture in large quantities.

[0028] A thick green extract can be obtained by condensing the green extract obtained by the above-mentioned approach. Here, especially a limit does not have the approach of concentration and it can adopt well-known approaches, such as ultrafiltration, a membrane concentration method like reverse osmosis or a vacuum concentration method, and the freezing condensing method. a thick green extract can be obtained by this concentration, without spoiling the color tone of a green system, and it can work intentionally to shelf life by the increment in the sugar which is useful to quality maintenance with concentration -- handling both becomes easy by reduction in the volume.

[0029] Furthermore, it can be made to be able to dry and the concentration green extract obtained by the above-mentioned approach can be made into green extract fine particles. Especially a limit does not have the approach of desiccation and it can adopt well-known approaches, such as freeze drying and spray drying. While being able to work intentionally to shelf life by reducing a moisture content remarkably by making it dry, handling becomes easy by reduction in the volume.

[0030] The green coffee extract of this invention presents the color tone of skillful yellow - an yellowish green system, by the judgment by the Lab hunter color coordinate system, 50.8 and a value have L value in the range of 21.8, and 11.2 and b value mean what shows absorption maximum wavelength near [ near 670nm ] wavelength.

[0031] it is the thing which it was presumed that the green coffee extract of this invention presented the color tone of a yellow - yellowish green system because a certain chemical change started to the component of coffee beans by boiling with the hot water in a manufacture process, and chlorogenic acid and one of metal ions combined and which carries out a thing reason -- it is presumed. Chlorogenic acid is contained in the fruits of many dicotyledonous plants, a leaf, etc., is contained especially in coffee beans so much, is contained in coffee student beans no less than 6.5 to 9.0%, and has the property combined with a metal ion, caffeine, etc. Furthermore, if it combines with trivalent iron ion, it will become a black compound, and presenting orange is known for alkalinity.

[0032] The green coffee extract of this invention presents the color tone of a green system precious as natural product coloring matter, and further, since it is the natural product origin, and safety is high, application large as natural coloring agent the object for eating and drinking, the object for cosmetics, for drugs, etc. is expected. Since especially the natural product coloring matter of a green system is not abundant, by blending the green coffee extract of this invention, a fresh impression is given visually and the coloring effectiveness can be expected from other drinks other than a coffee drink.

[0033] Moreover, the green coffee extract of this invention has the grass's weak aroma and weak taste. Since it is weak aroma and a taste, when it is used for eating-and-drinking article processing, in order not to spoil the flavor or taste of food original, use in an eating-and-drinking article is widely possible,

and application large as natural coloring agent for eating and drinking is expected.

[0034] Moreover, since the green coffee extract obtained by this invention is what is obtained by boiling extract, it can be saved by performing under sterile the process which others accompany and carrying out aseptic to containers, such as a can, a bottle, and PET, but although the below-mentioned example 2 of an experiment explains, the thing saved in a dark place, such as saving using a protection-from-light nature container, is desirable. Moreover, you may sterilize if needed, the means corresponding to the configuration of a green coffee extract shall be adopted, for example, when a green coffee extract is a liquid, the approaches of common knowledge of \*\*, such as filtration which used the membrane filter etc., can be used for the approach of sterilization. However, although the below-mentioned examples 3 and 4 of an experiment explain, sterilization of long duration is not suitable at an elevated temperature.

[0035] Moreover, since the coffee-beans residue after carrying out the boiling extract of the green coffee extract of this invention is applicable to manufacture of real coffee, canned coffee, instant coffee, etc. and can aim at a deployment of coffee beans by processing like the usual coffee beans, without performing special processing, the problem of the waste treatment which the manufacture site of natural product coloring matter holds is mitigable. However, it cannot be overemphasized that it is restricted when a green coffee extract is manufactured using the coffee beans of quality which were suitable for the bevel use when the coffee-beans residue after the extract of a green coffee extract was used for a bevel use.

[0036] [0037] which explains this invention to a detail further hereafter using the example of examination which examined the optimal conditions in a washing process and an extract process (Example 1 of examination) Examination for choosing the adding-water ratio to the desirable coffee beans of the water used for boiling washing in a washing process was performed. the this coffee-beans residue after carrying out boiling washing of the water for 30 seconds to coffee student beans by the adding-water ratios (water/beans) 4, 5, and 10 and 20 or 40, 100 times and separating the coffee-beans residue after washing from a penetrant remover -- a adding-water ratio (water/beans) -- by 20 times The desirable adding-water ratio of the hot water used for boiling washing was judged with the absorbance the color tone of the green coffee extract of this invention obtained by carrying out a boiling extract for 5 minutes, absorption maximum wavelength, and near 670nm. A result is shown in Table 1. in addition - that the adding-water ratio (water/beans) used by this detail letter indicates the weight ratio of hot water to coffee beans to be -- carrying out -- for example, a adding-water ratio (water/beans) -- 5 times as many hot water as this shall mean the hot water of 5 weight sections to the coffee beans of 1 weight section

[0038] While the color tone judged by evaluation by the naked eye, it judged based on the hunter Lab color coordinate system, and L value, a value, and b value were measured with the color difference meter. If lightness is bright when L value becomes large, and it becomes small, it will become dark, and \*\*\*\* will become strong if blueness of a chromaticity is strong when a value becomes large, its redness is strong when \*\*\*\* will become strong if it becomes small, and b value becomes large, and it becomes small. It asked for absorption maximum wavelength by changing the wavelength of light, measuring an absorbance and obtaining an absorption spectrum by measuring the wavelength which shows the absorption maximum. An absorbance is measured with an absorptiometer, and on the wavelength near 670nm, the thickness of the color of a green system can be judged, and green becomes deep, so that this value is large. In addition, it sets in the green judging column of the appearance of front Naka, and is O at 0.3 or more absorbances. With 0.2 or more absorbances, or less by 0.2, O and an absorbance consider as x, when \*\* and an absorbance are below sensitiveness.

[0039]

[Table 1]

洗浄条件	加水比(水/豆)	4 倍	5 倍	10倍	20倍	40倍	100倍
	煮沸時間	30秒	←	←	←	←	←
抽出条件	加水比(水/豆)	20倍	←	←	←	←	←
	煮沸時間	5 分	←	←	←	←	←
評価結果	外觀の緑色判定	△	○	○	○	◎	◎
	色調	薄緑色	緑色	緑色	緑色	緑色	緑色
	極大吸収波長 (nm)	674	675	674	673	673	674
	670nm付近の吸光度	0.198	0.243	0.245	0.276	0.333	0.49
	L値	78.42	84.67	85.48	74.02	76.94	73.38
	a値	-5.68	-14.7	-13.83	-21.46	-14.97	-20.96
	b値	26.08	17.96	18.11	20.47	14.77	22.4

[0040] if Table 1 is seen -- a adding-water ratio (water/beans) -- 5 or more times -- the green which can carry out a color tone and green thickness as a green coffee extract of this invention -- being shown -- a adding-water ratio (water/beans), although the desirable green which can be carried out as a green coffee extract of this invention by 40 or more times was shown especially a adding-water ratio (water/beans) -- in 4 times, the absorbance near 670nm was 0.198, green thickness was thin, moreover, a value was -5.68, whenever [ green ] became low, and the color tone by macro-scopic evaluation was also a light green color. therefore, a adding-water ratio (water/beans) -- in 4 times, he can understand that especially the thing of 40 times or more is desirable 5 or more times not much preferably.

[0041] (Example 2 of examination) By performing boiling washing twice in 30 seconds, the effect which it has on production of the green coffee extract of this invention was considered. Examination was performed like the example 1 of examination except performing boiling washing twice in 30 seconds.

[0042] Consequently, also when a adding-water ratio was 4 times, the absorbances near 670nm are 0.489, the L value 75.1, the a value -21.23, and the b value 18.06, the color tone also with green macro-scopic evaluation was able to be presented, and it was able to carry out preferably. In the case of 5, 10, and 20 or 40,100 times, like the example 1 of examination macro-scopic evaluation and evaluation by the hunter Lab color coordinate system The green which can be carried out as a green coffee extract of this invention is presented, and the thickness which can also carry out green thickness as a green coffee extract of this invention is shown. The absorbance near 670nm Respectively, it is 0.352, 0.403, 0.405, 0.387, and 0.512, and it became clear that green became deep also in the flume gap in comparison with the example 1 of examination of 1-time washing. therefore, a adding-water ratio (water/beans) -- even if it was 4 times, it became clear by performing boiling washing for 30 seconds twice that it is desirable to be able to carry out and to perform boiling washing twice rather than 1 time in boiling washing for 30 seconds.

[0043] (Examples 3, 4, 5, and 6 of examination) It inquired in order [ in a washing process ] to choose the time amount of desirable boiling washing. In the example 3 of examination, a adding-water ratio (water/beans) is 5 times, and was performed like the example 1 of examination except carrying out boiling washing in 30 seconds, 1 minute, 5 minutes, and 30 minutes. The result is shown in Table 2.

[0044]

[Table 2]

洗浄条件	加水比(水/豆)	5倍	5倍	5倍	5倍
	煮沸時間	30秒	1分	5分	30分
抽出条件	加水比(水/豆)	20倍	20倍	20倍	20倍
	煮沸時間	5分	5分	5分	5分
評価結果	外観の緑色判定	○	◎	◎	◎
	色調	緑色	黄緑色	緑色	緑色
	極大吸収波長(nm)	675	675	675	673
	670nm付近の吸光度	0.243	0.36	0.434	0.355
	L値	84.67	79.51	77.39	80.06
	a値	-14.7	-17.74	-19.87	-17.48
	b値	17.98	19.37	19.46	15.81

[0045] Although the thickness greener than Table 2 of boiling washing time amount was a little thin in 30 seconds, as for the color tone, macro-scopic evaluation and evaluation by the hunter Lab color coordinate system presented the green which can be carried out as a green coffee extract of this invention by any boiling washing time amount. Therefore, more than for 30 seconds, a adding-water ratio (water/beans) has especially 1 - 5 minutes desirable in 5 times, when the above for 1 minute takes into consideration the financial side, such as desirable energy cost, especially.

[0046] The adding-water ratio (water/beans) performed the example 4 of examination like the example 3 of examination except carrying out boiling washing by 20 times. Consequently, the color tone in macro-scopic evaluation presents green by any boiling washing time amount. By boiling whose absorbance in the wavelength near 670nm is for 30 seconds, 1 minute, 5 minutes, and 30 minutes, respectively It was 0.276, 0.325, 0.447, and 0.342 and, in the case of 30 seconds, green was a little thin, but it became clear that the color tone in hunter Lab color-coordinate-system evaluation presented the desirable green color tone which can carry out as a green coffee extract of this invention in any case. therefore, a adding-water ratio (water/beans) -- although he can understand that 30 seconds or more can carry out preferably in 20 times, when the financial side, such as energy cost, is taken into consideration, especially 1 - 5 minutes are desirable.

[0047] In the example 5 of examination, the adding-water ratio (water/beans) was performed like the example 3 of examination except carrying out boiling washing by 40 times. Consequently, the color tone in macro-scopic evaluation presents green by any boiling washing time amount. By boiling whose absorbance in the wavelength near 670nm is for 30 seconds, 1 minute, 5 minutes, and 30 minutes, respectively It was 0.333, 0.484, 0.534, and 0.346, and green thickness is the thickness which can carry out as a green coffee extract of this invention in any case, and it became clear that hunter Lab color-coordinate-system evaluation also presented a desirable green color tone also in which boiling washing time amount. Therefore, a adding-water ratio (water/beans) can understand that 30 seconds or more can carry out preferably in 40 times.

[0048] In the example 6 of examination, the adding-water ratio (water/beans) was performed like the example 3 of examination except carrying out boiling washing by 100 times. As for the result, the color tone in macro-scopic evaluation presents green by any boiling time amount. By boiling whose absorbance in the wavelength near 670nm is for 30 seconds, 1 minute, 5 minutes, and 30 minutes, respectively It was 0.490, 0.449, 0.476, and 0.355, and green thickness is the thickness which can carry out as a green coffee extract of this invention in any case, and it became clear that hunter Lab color-coordinate-system evaluation also presented a desirable green color tone also in boiling washing time amount someday. Therefore, a adding-water ratio (water/beans) can understand that 30 seconds or more can carry out preferably in 100 times.

[0049] (Example 7 of examination) Examination for choosing the adding-water ratio to the desirable coffee beans of the hot water in an extract process which carries out a boiling extract was performed. hot water -- a adding-water ratio (water/beans) -- after carrying out boiling washing for 5 minutes by 20

times and discarding a penetrant remover, by the adding-water ratios (water/beans) 5 and 10 and 20 or 40, 100 times, the boiling extract was carried out for 5 minutes, the coffee extract was obtained, and the adding-water ratio (water/beans) of the desirable hot water used for a boiling extract was judged similarly to be the example 1 of examination.

[0050]

[Table 3]

洗浄条件	加水比(水/豆)	20倍	20倍	20倍	20倍	20倍
	煮沸時間	5分	5分	5分	5分	5分
抽出条件	加水比(水/豆)	5倍	10倍	20倍	40倍	100倍
	煮沸時間	5分	5分	5分	5分	5分
評価結果	外觀の緑色判定	×	◎	◎	○	△
	色調	茶褐色	緑色	緑色	緑色	薄緑色
	極大吸収波長(nm)	394	675	673	670	673
	670nm付近の吸光度	—	0.393	0.303	0.272	0.11
	L値	77.72	76.58	81.78	80.58	90.11
	a値	-1.65	-18.88	-17.4	-14.82	-6.87
	b値	22	21.8	18.99	21.41	13.58

[0051] Table 3 -- a adding-water ratio (water/beans) -- although each presented the green color tone in macro-scopic evaluation and hunter Lab color-coordinate-system evaluation in 10 or more times -- a adding-water ratio (water/beans) -- 40 or more times -- the absorbance near 670nm -- falling -- a little -- green -- thin -- becoming -- a adding-water ratio (water/beans) -- in 100 times, the absorbance near 670nm fell and it became clear that a value also became large. moreover, a adding-water ratio (water/beans) -- in 5 times, the color tone in macro-scopic evaluation was not able to present blackish brown, and was not able to acquire a green coffee extract. Therefore, he can understand that the adding-water ratio (water/beans) is indispensable 10 or more times, its ten to 40 times are desirable, and ten to 20 times are desirable especially.

[0052] (Examples 8, 9, and 10 of examination) It inquired in order [ in an extract process ] to choose the time amount of a desirable boiling extract. the example 8 of examination -- a adding-water ratio (water/beans) -- it carried out like the example 7 of examination by 20 times except boiling for 30 seconds, 3 minutes, 5 minutes, 10 minutes, 20 minutes, and 30 minutes. This result is shown in Table 4.

[0053]

[Table 4]

洗浄条件	加水比(水/豆)	20倍	20倍	20倍	20倍	20倍	20倍
	煮沸時間	5分	5分	5分	5分	5分	5分
抽出条件	加水比(水/豆)	20倍	20倍	20倍	20倍	20倍	20倍
	煮沸時間	30秒	3分	5分	10分	20分	30分
評価結果	外觀の緑色判定	◎	◎	◎	◎	○	×
	色調	緑色	緑色	緑色	緑色	緑色	褐色
	極大吸収波長(nm)	675	673	675	675	672	393
	670nm付近の吸光度	0.358	0.495	0.708	0.854	0.338	2.874
	L値	79.36	70.43	64.74	60.03	70.03	86.84
	a値	-14.18	-16.63	-21.49	-25.49	-11.17	-5.41
	b値	10.55	15.45	13.79	17.51	27.47	28.74

[0054] From Table 4, the green thickness to which the time amount of a boiling extract can carry out the green thickness till 20 minutes and a color tone as a green coffee extract of this invention, and green

were presented, and it became clear that the deep, especially green especially green coffee extract in 5 or 10 minutes could be manufactured. On the other hand, in 30 minutes, it became clear that the color tone in macro-scopic evaluation cannot become brown if it exceeds, a green coffee extract cannot be obtained, and a value becomes large in 20 minutes although the color tone in macro-scopic evaluation presents green, and whenever [ green ] became low a little. Therefore, he can understand that less than for 20 minutes is desirable, and the range for [ 30 seconds - ] 10 minutes is especially desirable.

[0055] the example 9 of examination -- a adding-water ratio (water/beans) -- it carried [ for 3 minutes ] out like the example 8 of examination for 30 seconds by 40 times for 20 minutes for 10 minutes for 5 minutes except carrying out a boiling extract for 30 minutes. This result is shown in Table 5.

[0056]

[Table 5]

洗浄条件	加水比(水/豆)	20倍	20倍	20倍	20倍	20倍	20倍
	煮沸時間	5分	5分	5分	5分	5分	5分
抽出条件	加水比(水/豆)	40倍	40倍	40倍	40倍	40倍	40倍
	煮沸時間	30秒	3分	5分	10分	20分	30分
評価結果	外観の緑色判定	△	○	◎	◎	◎	◎
	色調	薄緑色	薄緑色	緑色	緑色	緑色	緑色
	極大吸収波長(nm)	673	673	675	673	673	674
	670nm付近の吸光度	0.261	0.403	0.851	0.564	0.640	0.638
	L値	82.99	75.49	60.74	67.3	65.61	65.23
	a値	-11.01	-14.25	-24.8	-18.32	-21.05	-21.3
	b値	10.04	12.83	15.57	16.32	16.56	17.53

[0057] From Table 5, it is green and it became clear the green thickness to which the time amount of a boiling extract can carry out green thickness and a color tone as a green coffee extract of this invention in 5 minutes or more, and that the deep, especially green especially green coffee extract in 5 minutes could be manufactured. on the other hand -- 3 or less minutes -- a value -- \*\*\*\* -- it became, whenever [ green ] became low a little, the absorbance in the wavelength near 670nm fell in 30 seconds further, and the thing which it hears and which green becomes thin became clear. Therefore, he can understand that the above for 3 minutes is desirable, and the range for [ 5 minutes - ] 10 minutes is especially desirable if economical efficiency, such as energy cost, is taken into consideration although it can carry out more preferably in 5 minutes or more.

[0058] the example 10 of examination -- a adding-water ratio (water/beans) -- it carried out like the example 8 of examination by 100 times except boiling for 30 seconds, 3 minutes, 5 minutes, 10 minutes, 20 minutes, and 30 minutes. This result is shown in Table 6.

[0059]

[Table 6]



洗浄条件	加水比(水/豆)	20倍	20倍	20倍	20倍	20倍
	煮沸時間	5分	5分	5分	5分	5分
抽出条件	加水比(水/豆)	100倍	100倍	100倍	100倍	100倍
	煮沸時間	10分	20分	30分	60分	90分
評価結果	外観の緑色判定	×	△	△	○	×
	色調	ほぼ無色	薄緑色	薄緑色	緑色	暗緑色
	極大吸収波長(nm)	666	664	666	664	622
	670nm付近の吸光度	0.091	0.166	0.211	0.284	0.441
	L値	89.33	76.23	72.95	71.69	59.3
	a値	-3.21	-0.368	-7.13	-9.21	-7.42
	b値	11.19	14.47	23.41	26.96	27.05

[0060] Although the green coffee extract was able to be obtained when Table 6 was seen, and the boiling extract was carried out for 60 minutes, in 10 or 90 minutes, the color tone by macro-scopic evaluation was not able to present mostly colorlessness and the dark green which wore the blacking wash, respectively, and was not able to obtain a green coffee extract. moreover -- boiling for 20 or 30 minutes -- the wavelength near 670nm -- an absorbance -- the respectively green thickness at 0.166 and 0.211 -- thin -- a value -- respectively -0.368 and -7.13 -- \*\*\*\* -- as soon as it heard, it became clear that whenever [ green ] is low and the color tone in macro-scopic evaluation also presented the light green color. therefore, a adding-water ratio (water/beans) -- in 100 times, when boiled for 60 minutes, the green coffee extract could be obtained, but when economical efficiency, such as energy cost, was taken into consideration, it was not able to say [ that it can carry out by being desirable, and ].

[0061] (Examples 11, 12, 13, and 14 of examination) The count of a boiling extract considered the effect which it has on generation of a green coffee extract at the extract process. coffee student beans -- receiving -- hot water -- a adding-water ratio (water/beans) -- the adding-water ratio (water/beans) after carrying out boiling washing for 5 minutes by 20 times and discarding a penetrant remover -- 1 and the extract obtained by carrying out 2 or 3 times were similarly judged for the boiling extract for 5 minutes in 20 times as many hot water as this to be the example 1 of examination. The result is shown in Table 7.

[0062]

[Table 7]

洗浄条件	加水比(水/豆)	20倍	20倍	20倍
	煮沸時間	5分	5分	5分
抽出条件	加水比(水/豆)	20倍	20倍	20倍
	煮沸時間	5分・1バッチ目	5分・2バッチ目	5分・3バッチ目
評価結果	外観の緑色判定	◎	◎	◎
	色調	緑色	緑色	緑色
	極大吸収波長(nm)	666	672	670
	670nm付近の吸光度	0.418	0.501	0.398
	L値	72.36	64.63	72.4
	a値	-14.98	-18.18	-15.38
	b値	13.54	18.87	22.62

[0063] Consequently, while being able to understand that a green coffee extract is obtained also by repeating a batch, and especially its 2 batch eye especially is [ the color tone of the green system of a green coffee extract ] deep, and whenever [ green ] is high, if few, he can understand that it is desirable to perform an extract twice.

[0064] In the example 12 of examination, it carried out like the example 11 of examination except carrying out the boiling extract of the extract time amount in 10 minutes. Consequently, the absorbances near 670nm are 0.587, 0.785, and 0.694 by 1 batch eye, 2 batch eye, and 3 batch eye, respectively, a values are -16.07, -23.54, and -20.82, b values were 14.47, 22.63, and 23.47, the color tone in macroscopic evaluation also presented the green which can use as a green coffee extract of this invention in any case, and green thickness and a color tone showed the suitable result especially by 2 batch eye. therefore, a green coffee extract is obtained also by repeating a batch, and especially its 2 batch eye especially is [ the green of a green coffee extract ] deep, and whenever [ green ] is high -- he can understand things.

[0065] the example 13 of examination -- a adding-water ratio (water/beans) -- it carried out like the example 11 of examination except carrying out a boiling extract by 40 times. Consequently, although the absorbances near 670nm were 0.235, 0.245, and 0.164 by 1 batch eye, 2 batch eye, and 3 batch eye, respectively, and its green thickness was thin, and it was \*\* carried out of whenever [ green ] becoming low also when a values were -9.51, -10.88, and -7.14 and any, respectively, each color tone in macroscopic evaluation presented the green color tone. therefore, a green coffee extract is obtained also by repeating a batch, and especially its 2 batch eye especially is [ the green of a green coffee extract ] deep, and whenever [ green ] is high -- he can understand things.

[0066] In the example 14 of examination, it carried out like the example 13 of examination except carrying out the boiling extract of the extract time amount in 10 minutes. a values are -13.15, -15.54, and -9.43, b values were 13.06, 22.63, and 19.80, the absorbances near 670nm are 0.391, 0.401, and 0.333 by 1 batch eye, 2 batch eye, and 3 batch eye, respectively, and green thickness and a color tone showed [ the color tone in macro-scopic evaluation also presented the green which can use as a green coffee extract of this invention in any case, and ] the suitable result especially by 2 batch eye. therefore, a green coffee extract is obtained also by repeating a batch, and especially its 2 batch eye especially is [ the green of a green coffee extract ] deep, and whenever [ green ] is high -- he can understand things.

[0067] (Example 15 of examination) Roast of coffee beans considered the effect which it has on production of a green coffee extract. They are 20 times and 2000g hot water. 100g of coffee student beans which perform production of a coffee extract like the example 1 of examination and which do not roast by carrying out a basis, and 100g of coffee roasted beans roasted for 1, 2, 3, and 4 minutes -- using -- boiling washing -- a adding-water ratio (water/beans) -- for 100 degrees C and 10 minutes -- carrying out -- a boiling extract -- a adding-water ratio (water/beans) -- it is 20 times and 2000g hot water, and carried out 11 times in 100 degrees C and 5 minutes. It judged by measuring the color tone of the obtained coffee extract, and the absorbance near 670nm. Moreover, each roast value was calculated, there is only no roast time amount and the effect which gives generation of a green coffee extract also with a roast value was considered. In addition, the roast value was measured by COLOR AND COLOR DIFFERENCE METER MODEL 1001DP (Nippon Denshoku make). The result is shown in drawing 2, drawing 3, and drawing 4.

[0068] Drawing 2 is drawing showing the relation between whenever [ roast time amount and roast ], and an absorbance with a wavelength of 670nm, drawing 3 is drawing showing the relation between roast time amount and lightness (L value), and the absorbance of 670nm and drawing 4 are drawings showing the relation between roast time amount and a chromaticity (a value, b value).

[0069] It became clear that the absorbance of the wavelength near 670nm rises [ roast time amount ] till 2 minutes, the absorbance of the wavelength near 670nm would become low 1/3, and the green thickness of a green coffee extract would become thin from drawing 2 if it becomes deep and, as for the green thickness of a green coffee extract, roast time amount exceeds 3 minutes as roast progresses. When fluctuation does not almost have roast time amount in L value till 2 minutes and roast time amount exceeded 3 minutes from drawing 3, L value became large, and fluctuation did not almost have a value and b value from drawing 4 till roast 2 minutes, either, but when roast time amount exceeded 3 minutes, a value and b value became large and the thing check was carried out. Therefore, when roast time amount exceeded 3 minutes, it was checked that change appears in a color tone and it became clear that it is desirable to carry out in less than 3 minutes as for roast time amount.

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[Translation done.]

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1. This document has been translated by computer. So the translation may not reflect the original precisely.
2. \*\*\*\* shows the word which can not be translated.
3. In the drawings, any words are not translated.

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EXAMPLE

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[Example]

[0071] This invention is not limited by this example although an example explains this invention for this invention concretely below.

[0072] (Example 1) Boiling washing was performed for 800g of coffee roasted beans which \*\*\*\*\* (ed) raw beans for 10 minutes at 100 degrees C among 2000g hot water for 2 minutes and 30 seconds, the washing process which separates the coffee-beans residue after washing from a penetrant remover was performed 7 times, and the penetrant remover was collected and discarded. At this time, the penetrant remover was brown suspension. Then, the boiling extract of the above-mentioned coffee-beans residue was carried out for 5 minutes at 100 degrees C among 2000g hot water, the process which separates an extract from coffee-beans residue was performed 6 times, and coffee extracts were collected. organic-functions evaluation of the obtained coffee extract is performed about a color, the taste, and three items of stinking thing -- absorption maximum wavelength was both searched. Consequently, evaluation that yellow - yellowish green are presented and it has the grass's weak aroma and weak taste could be obtained, and it was indicated near 670nm that the absorption maximum agreed with the color tone evaluation by vision. The green coffee extract of this invention which has the color tone of a green system precious as natural product coloring matter was able to be obtained from the above result.

[0073] (Example 2) the approach of an example 1 -- applying correspondingly -- coffee student beans -- a adding-water ratio (water/beans) -- the washing process which consists of boiling washing for 5 minutes at 100 degrees C with 20 times as many hot water as this, and the coffee-beans residue after washing -- a adding-water ratio (water/beans) -- pass the extract process which becomes by the boiling extract for 5 minutes at 100 degrees C with 20 times as many hot water as this -- the green coffee extract of this invention was obtained. The washing process and the extract process were performed once, respectively.

[0074] (Example 3) It applied correspondingly with the approach of the property example 1 of a green coffee extract, and the green extract was obtained through the washing process which consists of boiling washing for 10 minutes at 100 degrees C with 2000g hot water in 100g of coffee student beans, and the extract process which consists the coffee-beans residue after a washing process of a boiling extract for 5 minutes at 100 degrees C among 2000g hot water. Here, the washing process performed the extract process 11 times 7 times. Furthermore, it condensed until the volume became a quadrant about this extract, and the thick green extract was obtained. The fusibility formed element of a penetrant remover, green extract, and thick green extract, a BRIX value, and pH were measured. The degree of BRIX was measured with the commercial refractometer, and pH was measured with the commercial pH meter.

[0075] consequently, the fusibility component of a penetrant remover, green extract, and thick green extract -- respectively -- 5.24 - 5.25%, 0.17 - 0.18%, and 2.52 - 2.53% -- it is -- a BRIX value -- respectively -- 6.56 and 0. -- it was 22 and 3.12 and pH was 5.76, 7.09, and 8.17, respectively.

[0076] Next, the green extract and thick green extract which are an extract undiluted solution were compared with the detail. Specifically, the absorbance in a color tone, absorption maximum wavelength,

and absorption maximum wavelength compared. The measuring method of a color tone, absorption maximum wavelength, and an absorbance was performed by the same approach as the example 1 of examination.

[0077] consequently, the absorption maximum wavelength of a green extract and a thick green extract -- respectively -- 672nm and 666nm -- almost -- equivalent -- an absorbance -- respectively -- 0. -- although the coloring matter component is the same since it was 65 and 1.60, it is understood that coloring matter constituent concentration became high by concentration. Moreover, although it was checked that a color tone is discolored in black since L value became small, although -21.7, -19.4, and b value of 65.3, 28.8, and a value is [ L value of a green extract and a thick green extract ] 10.8 and 14.6, respectively and there was no big fluctuation in a value and b value, as for this, it is understood that a coloring matter component is a thing resulting from having become deep. From the above result, a green coloring matter component cannot change with concentration, and a thick green extract can be obtained.

[0078] (Example 1 of an experiment) The effect which acid-proof and pH over the green coffee extract obtained in the alkaline trial example 3 have was considered. The green extract obtained in the example 3 was adjusted to pH 2-10, and while the wavelength near 670nm carried out the spectrometry of the degree of the fading and judging it, change of a color tone was judged. It should judge with it being easy to fade, so that an absorbance falls, and change of a color tone should be evaluated based on the hunter Lab color coordinate system, and L value of the green coffee extract in each pH, a value, and b value were measured with the color difference meter. The result is shown in drawing 5 , drawing 6 , and drawing 7 .

[0079] Drawing 5 is drawing showing the effect of pH with wavelength with an absorption wavelength of 670nm, drawing 6 is drawing showing the effect of pH with a lightness L value, and drawing 7 is drawing showing the effect of pH with a chromaticity (a value, b value).

[0080] It is changeless to the absorbance of the wavelength near 670nm, and a color tone, and it was checked from drawing 5 , and 6 and 7 in the neutral region of pH 6-8 that a green coffee extract is stabilized. On the other hand, on acid conditions, the fall of an absorbance was checked, by pH 2-3, the inclination was especially remarkable, a value shifted to + side, b value also became large, and presenting red yellow was checked. On the other hand, on alkali conditions, although most change of an absorbance was not checked, while L value fell and being discolored a little in black, b value became large and yellowing a little was checked. It was checked from the above result that it is suitable for the green coffee extract of this invention being suitable for using for coloring of a neutral and alkaline eating-and-drinking article etc., and using for coloring of a neutral eating-and-drinking article etc. especially.

[0081] (Example 2 of an experiment) The effect which the light to the green coffee extract obtained in the radiationproofing test example 3 has was considered. Specifically, the example of an exam checks the light stability in the fluorescent lamp exposure of a green coffee extract. 1, 2, 3, and 4 or 96,121-hour continuous irradiation were performed under the 11000 luxs environment to the green extract obtained in the example 3. The degree of fading and change of a color tone were judged by the same approach as the example 1 of a trial. The green extract which does not perform an optical exposure as control was used. The result is shown in drawing 8 , drawing 9 , and drawing 10 .

[0082] Drawing 8 is drawing showing the effect of light with an absorbance with an absorption wavelength of 670nm, drawing 9 is drawing showing the effect of the light of pH with a lightness L value, and drawing 10 is drawing showing the effect of light with a chromaticity (a value, b value).

[0083] It was checked that are the optical exposure of 96 hours or more, and an absorbance is set to 0 by drawing 8 although the absorbance of the wavelength near 670nm is hardly changed to an exposure for 4 hours. It was checked that L value does not have the effect of an optical exposure, a value changes with drawing 10 in the direction of + by the exposure of 96 hours or more, as for b value, it becomes large that a green coffee extract carries out the erythrochromia on the other hand, and a green coffee extract yellows a little by drawing 9 . Therefore, it became clear that a certain amount of lightfastness was shown from the green coffee extract of this invention having been stable in the optical exposure of 4 hours. However, since fading by putting on the bottom of a fluorescent lamp for a long time was also

checked, the thing saved in a dark place, such as saving in the container of protection-from-light nature, such as a brown bottle, is desirable.

[0084] (Example 3 of an experiment) The effect which the heat to the green coffee extract obtained in the heat resistance test 1 example 3 has was considered. the green extract obtained in the example 3 -- the inside of an incubator -- 55 degrees C -- 1, 2, and 3 -- it was kept warm for 4 or 96,121 hours. The degree of fading and change of a color tone were judged by the same approach as the example 1 of a trial. The green extract which does not keep it warm was used as control. The result is shown in drawing 11, drawing 12, and drawing 13.

[0085] Drawing 11 is drawing showing the effect of heat with wavelength with an absorption wavelength of 670nm, drawing 12 is drawing showing the effect of heat with a lightness L value, and drawing 13 is drawing showing the effect of heat with a chromaticity (a value, b value).

[0086] From drawing 11, incubation is hardly changed for 4 hours, but the absorbance of the wavelength near 670nm is incubation of 96 hours or more, and becoming an absorbance 0 was checked. From drawing 12, L value fell a little by incubation, and being discolored in black was checked. Moreover, it was checked that b value becomes large by incubation of 96 hours or more, and changing and carrying out the erythrochromia of the a value in the direction of + by incubation of 96 hours or more from drawing 13 yellows. Therefore, it became clear that a certain amount of thermal resistance was shown from the green coffee extract of this invention having been stable in the incubation by 4 hours. However, since fading if it sets under an elevated temperature for a long time was also checked, it was proved under the high temperature service that it is long duration Lycium chinense that it is not desirable, either.

[0087] (Example 4 of an experiment) The thermal resistance of the green coffee extract of heat resistance test 2 this invention and commercial natural product coloring matter was compared. Both thermal resistance was compared by specifically processing the green coffee extract manufactured in the example 2 of this invention, and new green ASNo.15 (0.3% addition) for 20 minutes at 100 degrees C. It judged by comparing the degree of fading and the absorbance of 670nm change of color tone processing-before, and after processing, and a color tone. A result is shown in Table 8.

[0088] new green ASNo.15 (0.3% addition) used as contrast -- carthami flos yellow coloring matter and a gardenia -- blue -- base is prepared, clear green is presented and it is comparatively stable natural product coloring matter pharmaceutical preparation to heat.

[0089]

[Table 8]

緑色コーヒー抽出物

	結果(色)	色調	極大吸収波長(nm)	670nm付近の吸光度	L値	a値	b値
処理前	○	緑色	667	0.514	62.42	-10.59	13.46
処理後	○	暗緑色	666	0.891	39.52	-10.07	28.8

ニューグリーンASNo. 15 (0.3%添加)

	結果(色)	色調	極大吸収波長(nm)	670nm付近の吸光度	L値	a値	b値
処理前	○	緑色	597	0.604	59.02	-15.26	26.57
処理後	○	緑色	596	0.53	59.78	-13.37	26.25

[0090] From Table 8, by giving heat, the absorbance in absorption maximum wavelength became high in the green coffee extract of this invention, and it was almost changeless at new green ASNo.15 (0.3% addition). Moreover, it became clear that the lightness L value of the green coffee extract of this invention became small, and, as for b value, being discolored in black became large a little again. On the other hand, as for new green ASNo.15 (0.3% addition), L value and b value hardly changed. Although it was checked by 100 degrees C and processing for 20 minutes from the above result that the green coffee extract of this invention is discolored in black, it was checked that new green ASNo.15 (0.3% addition)

do not produce change to a color tone.

[0091] Therefore, although it became clear that the thermal resistance of the green coffee extract of this invention was inferior to new green ASNo.15 (0.3% addition) a little He is red although the green coffee extract of this invention is also discolored a little in black by 100 degrees C and 20 minutes. - Since it became clear that it had a certain amount of thermal resistance from there being no change of a green color tone and the fall of an absorbance not having been accepted, either The possibility to use of this green coffee extract is suggested to food processing using heat.

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[Translation done.]

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DESCRIPTION OF DRAWINGS

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[Brief Description of the Drawings]

[Drawing 1] The flow chart of the manufacture approach of the green coffee extract of this invention.

[Drawing 2] Drawing showing the effect of the roast to manufacture of the green coffee extract of this invention with relation with a roast time amount and roast whenever and an absorbance of 670nm.

[Drawing 3] Drawing showing the effect of the roast to manufacture of the green coffee extract of this invention with the relation between roast time amount and lightness (L value).

[Drawing 4] Drawing showing the effect of the roast to manufacture of the green coffee extract of this invention with the relation between roast time amount and a chromaticity (a value, b value).

[Drawing 5] Drawing showing the effect of pH to the green coffee extract of this invention with wavelength with an absorption wavelength of 670nm.

[Drawing 6] Drawing showing the effect of pH to the green coffee extract of this invention according to lightness (L value).

[Drawing 7] Drawing showing the effect of pH to the green coffee extract of this invention with a chromaticity (a value, b value).

[Drawing 8] Drawing showing the effect of the light to the green coffee extract of this invention with wavelength with an absorption wavelength of 670nm.

[Drawing 9] Drawing showing the effect of the light to the green coffee extract of this invention according to lightness (L value).

[Drawing 10] Drawing showing the effect of the light to the green coffee extract of this invention with a chromaticity (a value, b value).

[Drawing 11] Drawing showing the effect of heat to the green coffee extract of this invention with wavelength with an absorption wavelength of 670nm.

[Drawing 12] Drawing showing the effect of heat to the green coffee extract of this invention according to lightness (L value).

[Drawing 13] Drawing showing the effect of heat to the green coffee extract of this invention with a chromaticity (a value, b value).

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[Translation done.]



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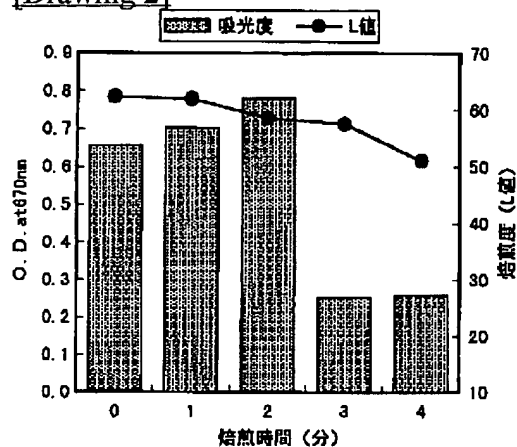
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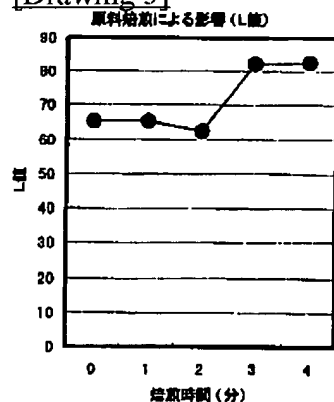
DRAWINGS

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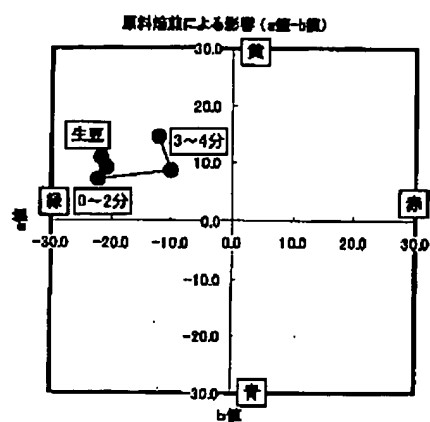
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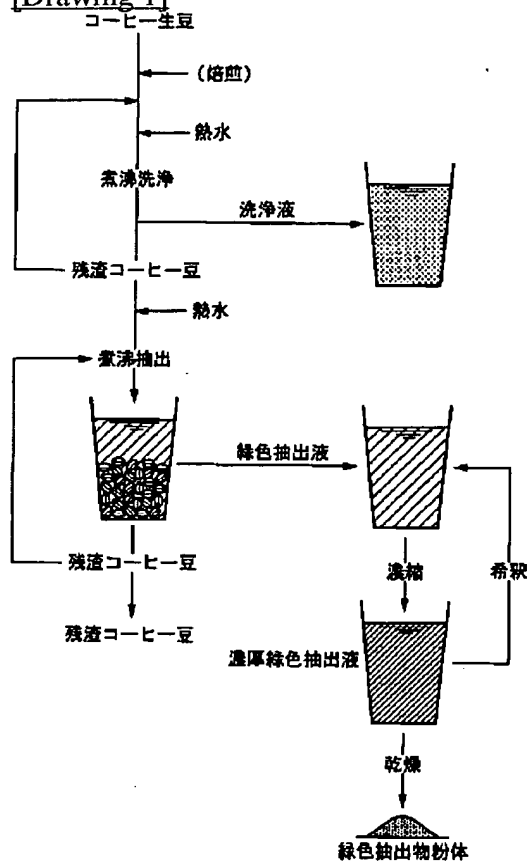
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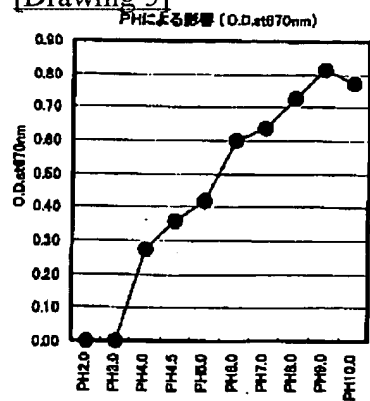
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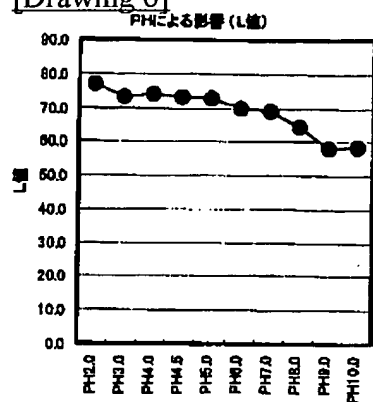
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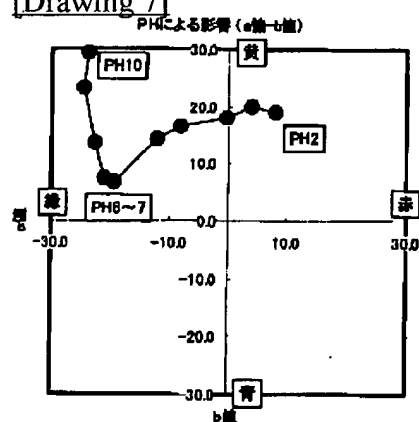
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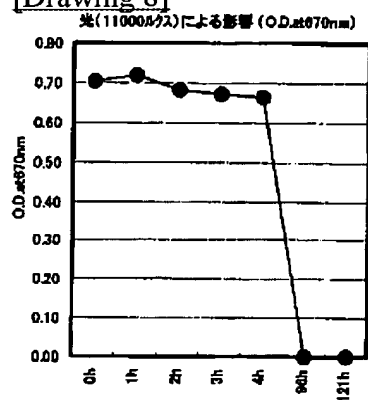
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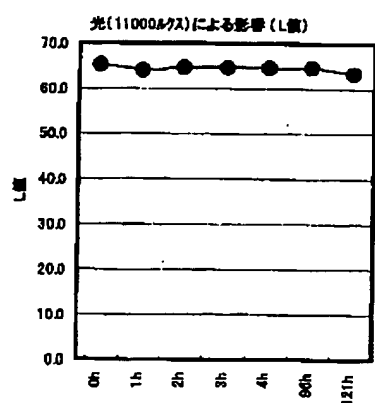
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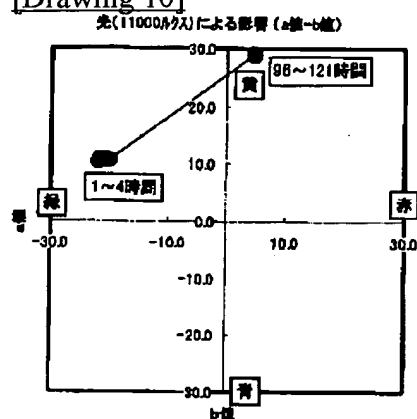
[Drawing 8]



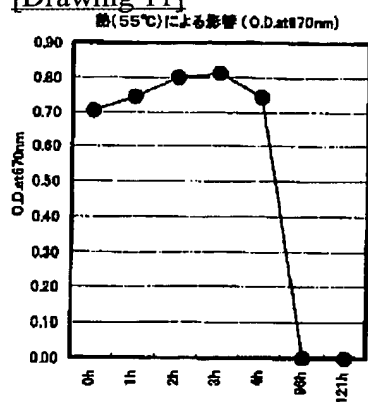
[Drawing 9]



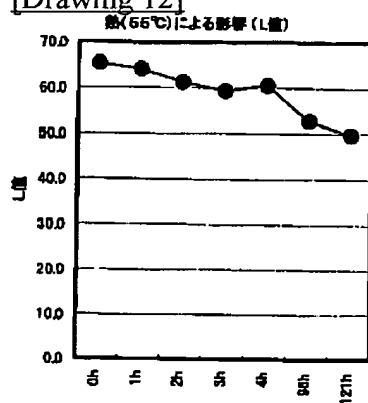
[Drawing 10]



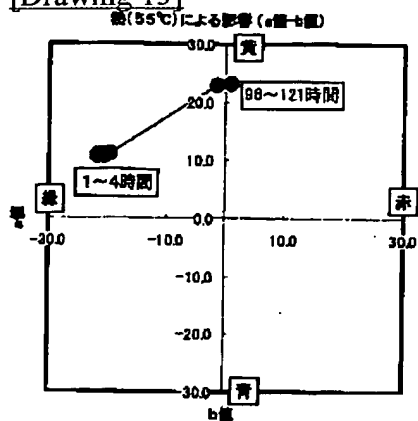
[Drawing 11]



[Drawing 12]



[Drawing 13]



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[Translation done.]